THE

JOURNAL OF GAS LIGHTING.

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XV. No. 360—18th YEAR.] LONDON, AUGUST 7, 1866. [Subscription per Ann. { 15s. in Advance / 18s. Credit.] Price 8d. Unstamped.

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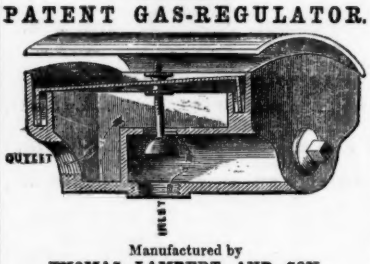

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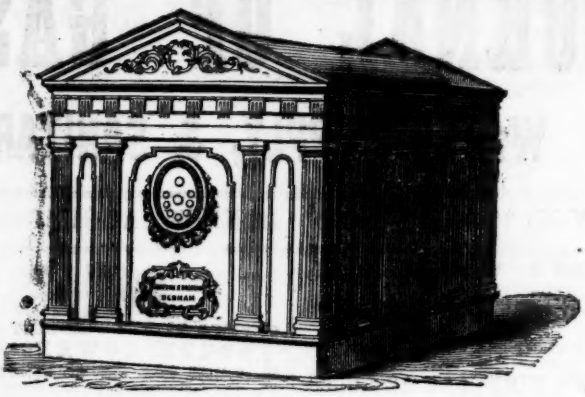

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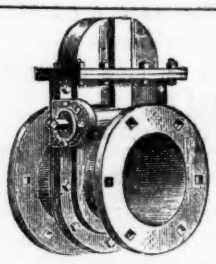

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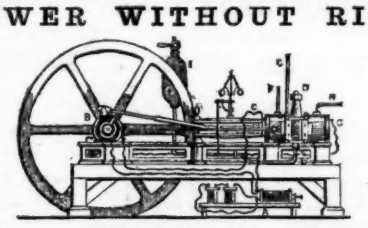

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

The next number will be published on Tuesday, August 21, and the subsequent numbers on each successive alternate Tuesday.

This JOURNAL has been duly registered at the General Post Office for transmission abroad.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, AUGUST 7, 1866.

Notes upon Passing Events.

THE Atlantic Telegraph is this week the inevitable subject of some notes from every one who has to write. Success has attended the combined efforts of "All the Talents" in the first great step. Every possible mechanical precaution was taken, the weather was favourable throughout, and the thing was done. Whether the cable will stand a twelvemonth and a day remains to be proved. If it do that, it will be a success, and render a repetition of the effort certain. But even if it only stands for three months, the British public will never be satisfied until, directly or roundabout, they have telegraphic communication with America. One cable will never satisfy the demands for rapid commercial news; perhaps full employment could be found for a dozen, at 10s. a word. The importance of a telegraphic communication increases with the distance in proportion to the amount of commerce between the two points. As long as the cable lasts it may be expected that the bill of lading of every valuable cargo will be telegraphed to the consignees, and this will open up quite a new system of doing American business. It must be expected that, with new advantages, new abuses will arrive. Speculators of every kind will endeavour to use the cable to assist their rigs of corn, cotton, or gold. But, as in every other improvement, we must be content to take the evil with the good.

The report of the select committee of the Commons on the postal and telegraphic communication with India, which has lately appeared, will pave the way for some important reforms in both branches of conveyance. The post by steamboats is pretty well within our own control. Bombay, connected as it shortly will be with all the network of Indian railways, must be the one port for European posts, and rise in importance accordingly. The committee took a favourable view of the suggestion of a weekly mail to Bombay, and therefore encouraged the new Indian Minister to press his co-Ministers for the needful funds. To establish a weekly post to India will be to make a permanent scratch in Indian history. Lord Cranborne might thus make powerful friends in London, Manchester, and Liverpool. The committee desire that use be made of the line of steamers which have been established by the French Government in the Indian and China Seas, and which have thus opened a competition in comfort, if not price, with the all-powerful P. and O. The committee foreshadow the effect of a permanent telegraphic communication with America, by reporting that, as regards "the East, the post-office has become sub-"sidiary to the telegraph." At present, this communication is far from satisfactory, for, after passing through the civilized regions of Europe, where either French or German is understood, and where the clerks have some training, it reaches the semi-barbarous Servia and Wallachia, and then passes into the hands of the Turks, at Constantinople, to be forwarded by way of Bagdad before reaching the British line to Kurrachee. The committee do not remark that it was the jealous feeling between France and England that prevented this Bagdad line from being worked by an English private company. As long as it is worked by Turks who smoke and pray between each half dozen messages, and who cannot be taught the value of time, decent despatch and ordinary correctness are out of the question. Cannot the matter be settled by an Anglo-French-Russian company employing European clerks at the telegraphs? In the meantime Russia has established a line, efficiently worked, to Busline; but it can scarcely suit us to be dependent on Russia for our Indian news. The Government lines of telegraph in India are very badly managed. They have never emerged from the condition of amateurship in which they were originally founded. It is high time that they were placed under the control of a trained English engineer, well acquainted with the practice and theory of telegraphy. Education has done nothing for India if it cannot supply natives and Europeans capable of taking charge of the various stations.

The new line to Brighton having been granted, a friendly alliance, if not a solid amalgamation, between all the South-Eastern and South Coast lines is eventually invitable. This will give the public the advantage of all the metropolitan stations, and to make use of all the portions of line constructed by the old Brighton line in the vain hope of keeping out the enemy. Competition between such companies as the South-Eastern, the London, Chatham, and Dover, and the Old Brighton, experience has proved to be both ruinous and absurd. In railways as in gas companies, the directors and officials are the great obstacles in the way of amalgamation. Who is to resign? Who is to play second fiddle? What is to be the compensation for patronage given up? These are difficulties which beset the way to the economy of condensation and cementration. But in the case of the Brighton and Dover Railways, eventual amalgamation is inevitable.

Mr. Seely, the member for Lincoln, who was a miller, and is a

partner in a great steam-engine factory, has succeeded in making a reputation for himself and creating a serious impression on the House by his industrious, pertinacious, and intelligent criticism of the work done in our royal dockyards. He has the disadvantage of having entered the House of Commons at a middle period of life, with no political or social connexions, with the common school education of a country tradesman's son, with political views, especially on the question of war, of a rather Utopian character; but he talks with common sense on a question important to the nation, which he understands, and, in spite of an insignificant figure and a feeble voice, he is listened to and respected. His last great speech had the advantage of being addressed to a First Lord and a Cabinet who are most anxious to conciliate a majority by practical reforms, having no chance of cooking political reforms to the taste of the Opposition. There was nothing in the work of the late Administration more pretentious or less satisfactory than that of the Admiralty. It was the profound remark of a French writer on the two navies that the French were dependent on the genius of one man, one eminent shipbuilder; that England, whose Admiralty management of dockyards is ridiculous, had all the genius and resources of the Thames, the Mersey, and the Clyde to fall back upon. The Duke of Somerset gave up construction to one clever inventor, Mr. Reed, to snub all rivals; Mr. Stansfeld and Mr. Childers floundered zealously, trying to wade through the confusion of centuries. Mr. Seely has, on this occasion, concentrated his investigations on a few points. He first took the cost of fitting boats, which the Admiralty admitted was to them a mystery, but his perseverance overcame official impossibilities. He found that at Portsmouth the cost exceeded the rate-book prices by £765 to £490, or by £275. At Chatham the cost of fitting 25 boats was 10 per cent. below the rate-book price, while at Portsmouth the cost of fitting 44 boats he found to be 17½ per cent. above the rate-book price, and 27½ above the Chatham price. Among the examples of repairs the honourable member cited the case of a 30-feet cutter which had been repaired at a cost of £110, but which if new built and fitted would cost only £42. A 22-feet gig had cost in repairs £58, which new built and fitted would cost £21; and three 20-feet gigs had cost £90, which if new would cost £58. In the return 1864-5 for the Portsmouth boathouses credit was claimed for a great improvement. It appeared, however, that the 83 boats repaired at a cost of £5685 had better have been burnt, for the dockyard people might have built and fitted 83 boats of the same size for about the cost incurred in repairing them. One cutter had been repaired at a cost of £66, which if new built and fitted would have cost £30. In the same way Mr. Seely showed that the Admiralty system of forging was wasteful and extravagant, and "yet the Admi-" ralty Committee actually recommended that the Admiralty " should begin to manufacture shoes for the navy and half-" boots for the Royal Marines." Perhaps a profitable compromise might be entered into under which the Admiralty should be allowed to become shoemakers and tailors on condition that they gave up building any ships, wooden or iron. After dissecting the fallacious Admiralty accounts, the member for Lincoln turned to the cost of ships. "The *Frederick* " *William* cost £281,691, instead of £134,453, or more than " double what she would have cost in a private yard. The " *Brisk* cost £43,498 in repairs, and could have been built new " for £49,321. As much, within £3000, was spent on the " *Cadmus* as would have built a new ship." Next came the iron ballast paving case. The best paving and brick wall would have cost under £20,000. But the naval authorities having 31,000 tons of cold-blast pig iron on hand, worth 105s. a ton, laid it down instead of selling it, and so lost £151,600 by the transaction, and have had to buy pig-iron at 108s. and 109s. a ton. The case of anchors was equally extraordinary although more open to a colourable defence. The favoured contractors for anchors to the navy are Brown, Lennox, and Co. Between 1854 and 1858 not less than 1500 small anchors were purchased from these gentlemen, and while the price of large anchors remained the same, the price rose successively from 25s. 5d. to 35s. per cwt., then to 36s., and from 1856 to 1858 to 40s. Mr. Seely calculated that since the date of the contract, Messrs. Brown and Co. had received for anchors £170,000 more than the market price. But then it had been urged by the Admiralty advocates that to obtain the best article price was a secondary question. The value of that answer depends on whether Brown and Lennox made the best anchors. Mr. Seely exhausted this part of the question. The Queen's yacht was supplied with a Trotman anchor made by Hawks and Crawshaw; so were the Peninsular and Oriental steamers; so was the *Great Eastern*. The Anchor Committee reported that while 13½ per cent. of Brown and Lennox failed under proof, of Hawks and Crawshaw 8 per cent. only failed. Out of six anchors tried, the Anchor Committee—composed of most distinguished admirals, two master attendants of Portsmouth and Sheerness, and five experienced members of Lloyds—pronounced the Admiralty pattern the worst and Trotman's the best anchor. No one else took part in the discussion who had any practical knowledge except Mr. Samuda. He said that nothing was more important than to possess a clear and actual knowledge of the cost of work. The failure of several firms could be traced to their inability to ascertain the cost of the works they were carrying out. To get a reformation of the dockyards a committee should be appointed, composed of civilians and naval officers, for the purpose of simplifying the accounts, and their labours ought not to terminate until the people engaged in the dockyards knew what each item cost. There is a fine field yet untilled in this Admiralty business for a young M.P. prepared to work now in order to hold a position in the future. Every day real knowledge clothed in intelligent words becomes a greater political power.

The National Gallery question may, we presume, be considered now settled, as far as site is concerned. Burlington Gardens have been selected by a decision of a large majority of the House of Commons, which it is not likely that either Lord John Manners or his successor will attempt to reverse. It is to be feared that the attempt to preserve Burlington House will sadly hamper the architect of the future National Gallery. But if a strong man is chosen, he will not be hampered, and we shall have a building worthy of the population and wealth of the metropolis of three million souls.

As for the Royal Academy, its future is still uncertain. No one knows whether it is to remain in Charing Cross, and take entire possession of the mustard-pots, or whether, listening to the voice of the charmer Cole, it is to migrate to South Kensington, and enter into a limited partnership of pleasure with the Horticultural Gardens and the galleries of science and art. There are those who claim the present abode of the National Gallery and Royal Academy for a share of the treasures of the British Museum, and would place at Charing Cross all the scriptural and architectural relics of classic and mediæval ages in a new palace. There is a third alternative, no one has yet suggested—the removal either of the Royal Academy or of the fine art collection of the British Museum to a building to be erected on some of the land reclaimed by the Thames Embankment. A fine building would be a great ornament to the banks of the river. At any rate, the Museum is at present bursting with buried treasures, and something must be done. Mr. Lowe, whom the windbags of the Reform League so much abuse, and whom, for his knowledge on every subject connected with literature, art, and education, both sides of the House of Commons listen to and respect, made statements of a very urgent nature in moving, in his capacity of official trustee, the usual votes for the British Museum. He said:—

Year after year the fine collection of objects in the British Museum is injured, lost, and buried, owing to the want of room. I think no one who moves this estimate will do his duty who does not call attention to that circumstance, though, perhaps, he may do so to but little effect. I will just mention two or three instances in illustration of what I mean. The beautiful specimens from Halicarnassus and the tomb of Mausolus are now, as the committee are aware, placed in a glass structure between the columns of the building—a most unsightly and unseemly spectacle to those who enter; and not only so, but the structure in which they are put away is by no means air-tight, but admits both damp and dirt, so that the specimens are getting spoiled because we cannot obtain grants in order to put them in a proper receptacle. Then, the collection of animals is another instance. The stuffed animals form a beautiful collection, but they are arranged in squadrons, I don't know how many deep, and if you want to see an animal you have to displace four or five to get at it. The third instance is that of Mr. Christy's collection—a magnificent gift—for which we are obliged from want of room to hire premises at 103, Victoria Street, to stow the specimens away, our main business being to find receptacles for the treasures acquired partly by the munificence of Parliament and partly by that of private donors. But that is not all the mischief that is done. There is besides the danger of fire, which no one can sufficiently be acquainted with. We had a fire lately in the bookbinders room, and what would have been the consequeuce if the valuable collection of books had all been burnt? Besides, therefore, the difficulty arising from the want of means of stowing things away, and the difficulty of access, there is the greatest risk of their perishing by fire. Thus this beautiful collection of shells which we purchased at so large a cost we are obliged to put away in drawers, and no one will be able to see them except one who knows what we have done with them. The fact is, the munificence of the country makes us purchase valuable collections from year to year, and then they are put away in some hole or corner where nobody can see them.

This sort of thing cannot go on. The nation, through the House of Commons, must make up its mind and settle where to build while the price of land is rising every day. The library of the British Museum cannot be better placed for students than where it is. The natural history and fine art collections might certainly be removed without injury and with advantage. Why should not everything connected with fine arts, in the way of pictures and sculpture, go to the new galleries in Burlington Gardens? Mr. Lowe is in favour of taking the natural history collection to South Kensington, and against giving £50,000 for an acre of ground behind the Museum in Bloomsbury. Mr. Walpole is quite willing to allow the collection to stay or to go, but he thinks something ought to be settled, and that the treasures we possess should be displayed, not warehoused like the purchases of a furniture broker who puts a case of stuffed birds under his bed, and a marble Antinous in the cellar, until he can find a customer. A site on the Thames for a fine public building, to balance St. Thomas's Hospital on the other side, should certainly be kept in view. But if the British Museum advances to Charing Cross, then public amusement and instruction will be best served by the removal of the Royal Academy to South Kensington. If, on the other hand, the Royal Academy remains and extends its present quarters, the naturalists will be happier at South Kensington than in Bloomsbury, and, with the railroad, the former quarter will be sufficiently accessible. It must not be forgotten that South Kensington presents at this moment the best specimen of what a museum should be in light and ornament.

The committee on the trade in animals have made their report, but not yet published their evidence. It is very difficult to object to the mature conclusions of men so eminent and respectable in their respective ways, and yet we do except to this compromise against common sense. The Government was represented by Mr. Milner Gibson, who has no particular opinions on any subject except the dead subject of free-trade. English graziers may be supposed to speak through Mr. Hunt, of cattle plague celebrity, Mr. Dent, Mr. Holland, Mr. Bankes Stanhope, Sir Matthew White Ridley, Lord Cranborne, and Mr. Wilbraham Egerton. Sir James Fergusson and Mr. Graham had Scotland under their care. The O'Conor Don and Mr. Cogan spoke for Ireland. Mr. Graves represented Liverpool interests; Mr. Norwood, Hull; Mr. Göschen and Mr. Alderman Salomons, the City of London. These experienced gentlemen, with others as makeweights, came to a report without any serious division, which we are inclined to respect from the weight of names, yet cannot help questioning. The committee came wisely to the conclusion that it is not possible at present to dispense with a live meat market in the metropolis and other large towns. They recommend that the metropolitan markets should be confined to animals intended for immediate slaughter, and that all animals exhibited there should be branded, not allowed to be exhibited again in any market, and slaughtered within ten days—a regulation it will be very difficult to enforce without a machinery of penalties and informers. They recommend that carcase butchers should be obliged to slaughter all they buy at public slaughter-houses. If so, the slaughter-houses should form part of the dead meat market. They recommend that the inspection carried out by the City be extended to the whole metropolis. As to the foreign trade, the committee say truly that inspectors cannot discover undeveloped seeds of disease in an animal, but consider quarantine and a separate market impracticable. We cannot understand this conclusion otherwise than as a concession to the power of the City of London and the monopoly of the trade. Rinderpest comes only from the Continent. It is worth some inconvenience to render its introduction impossible. A separate market where all foreign beasts from suspected countries should be slaughtered would make us safe. We wait for the evidence to explain why we are to run the risk of a mixed market.

The Registrar-General, in his weekly return, has made some invidious remarks on the East London Water-Works and their district, which we give in full, and also, in common justice, the reply of Mr. Charles Greaves, their engineer, also published in the *Times*, but in the Liberal *Daily News* only "*as an advertisement.*" With one observation of the Registrar we cordially agree. The public is not and will never be satisfied until the constant supply system is adopted. Cisterns cannot be kept clean. Half the cisterns of London are placed where they cannot be cleaned.

CHARGE.

It is a peculiarity of the case that the greater part of this slaughter in seven days of 1263 people of all ages took place within a limited portion of the London area. 924 of the deaths, 811 by cholera and 113 by diarrhœa, were registered in the six districts of Bethnal Green, Whitechapel, St. George's-in-the-East, Stepney, Mile-End Old Town, and Poplar, including Bow, among about a seventh part of the population of London and on one-fourteenth of its area. The attack extends all along the north side of the Thames, from the River Lea and the Isle of Dogs to the Tower of London. Limehouse Basin and the Regent's Canal are the central line of the attack, which stretches as far north as Victoria Park. This is essentially the port of London, inhabited by its maritime population. The canals and the basin are full of foul water, and are apparently connected with the Limehouse Cut, the Hackney Cut, and the River Lea. The East London Water-Works Canal draws its supply from the river at Lea Bridge, where there is a reservoir, and runs for a couple of miles by the side of the Hackney Cut down to its other reservoirs north of Bow and near the Lea. The present cholera field derives its waters from these works. It is right to add that the water has hitherto borne a comparison with the other London waters in Dr. Frankland's analysis. To-day at Poplar the water looks clear, and no complaints are made of its quality. The company will, no doubt, take exemplary pains to filter its waters; but it is not easy to guarantee the purity of water drawn from such a river as the Lea, in dangerous proximity to sewers, cuts, and canals.

REPLY.

Sir,—I observe in the weekly return of the Registrar-General, published in your paper of to-day, a statement so injurious to the East London Water-Works Company, and so likely to create public alarm, that, although I might on the company's behalf have been prepared to remain silent, I think you will feel me justified in asking a place in your columns for the purpose of allaying what I fear may be greatly misapprehended, and may, if unexplained, cause considerable public alarm.

In the return to which I allude, "the present cholera field" is reported as "deriving its water from the East London Water-Works," of which the "canal draws its supply from the river at Lea Bridge, where there is a reservoir, and runs for a couple of miles by the side of the Hackney Cut, down to the other reservoirs of the works north of Bow and near the Lea." It is added that "the company will no doubt take exemplary pains to filter its waters, but it is not easy to guarantee the purity of water drawn from such a river as the Lea, in dangerous proximity to sewers, cuts, and canals." From these passages every reader must infer that the East London Water-Works Company's supply is, when taken, the water of the Lea at no higher point than Lea Bridge; that it is thereafter led in an open canal in dangerous proximity to pollution; and that, although the company may have intentions about filtration, they in fact supply unfiltered water.

The facts are—

1. That although taken from the Lea at Lea Bridge, the waters of that river have been, at the expense of the East London Water-Works Company and the New River Company, protected from impurity by intercepting drains, and otherwise as high as Enfield, which is several miles above Lea Bridge, and the water, although locally taken by the company from the river some two or three miles above Lea Bridge, has in fact the purity of Enfield, where the river is running in a purely rural district.

2. That the water enters the filter beds of the company at Lea Bridge, and is conducted thence to their pumping establishment at Old Ford, in an iron pipe, and never sees the light or risks pollution between the filter bed and the consumer, and that the "canal" alluded to by the Registrar having been since 1853 disused for all purposes of supply, is only maintained as a drain from the filter bed to a lower part of the river.

3. That not a drop of unfiltered water has for several years past been supplied by the company for any purpose.

It is true that the Registrar notices that the East London Company's "water has hitherto borne a comparison with the other London waters in Dr. Frankland's analyses," and that "to-day the water looks clear, and no complaints are made of its quality," but these statements are in such "dangerous proximity" to the other less correct portions of the report, and to the affecting facts which appear to be stated as consequences of the assumed impurity of the water supply, that I have felt it my duty to request publicity for the above written explanations.

I impute no intentional misrepresentation, and I make no complaint, although when I found, on calling this afternoon at the Registrar-General's office, that he was using and acting upon an obsolete map of this district, I felt that better information should be in use by so important an officer, and that if it had been so the East London Water-Works Company would have escaped an unmerited censure and the public mind an unfounded cause of alarm.—I am, sir, your obedient servant,

CHARLES GREAVES,
Engineer of the East London Water-Works Company.

East London Water-Works, Old Ford, Aug. 1, 1866.

Circular to Gas Companies.

THE Imperial Gas Company have good reason to complain of having been dealt with harshly, not to say unjustly, by Parliament. In the last session the Bill for the extension of their works at Fulham and the increase of their capital was thrown out on the second reading in the House of Lords, without referring it to a committee. This session a Bill calculated to remove all objections raised to the former one passed the House of Lords, but was negatived on the second reading in the Commons, and the company were thus deprived of the means of obtaining money to pay for the works necessary to enable them to fulfil the obligations imposed on them by Parliament to supply gas when demanded. In that emergency it became necessary to apply to Parliament for power to raise the money absolutely wanted to meet existing liabilities, but the second Bill failed, in consequence of the Standing Orders Committee having refused to suspend the Standing Orders in its favour. The committee yielded, however, to strong representations of the necessity of the case, and a third Bill was in-

troduced giving the company power to raise £325,000 by the creation of new shares, and to borrow one-fourth of that amount, the maximum rate of dividend on the new capital being limited to 7½ per cent. That Bill passed through the House of Commons unopposed, and arrived at its last stage in the Lords, when Lord Redesdale required that the rate of dividend should be reduced to 7 per cent., thus rendering it almost impracticable to raise money by the issue of ordinary shares. The company made strenuous efforts to prevent that alteration in the Bill, and issued a printed appeal to their lordships stating in the first place the circumstances under which they applied to Parliament, and that the money was required to pay off debts and liabilities actually incurred, and to provide the means of supplying gas during the ensuing winter. It was also stated that they had ascertained beyond doubt that ordinary shares cannot be issued at par by any metropolitan gas company, if the maximum dividend be fixed so low as 7 per cent.; that the existing shares of the company are selling at a price that will pay 7½ per cent.; and that the shares of most of the metropolitan gas companies are selling to pay even a higher rate of interest; that if preference shares were issued the company would be unable afterwards t issue ordinary shares to raise the further sums of money the, would require; that Lord Redesdale's requirement would be singularly unjust, for in no instance had any of the thirteen metropolitan gas companies been subjected to the restriction of 7 per cent., and that there are no exceptional circumstances which call for special legislation in the case of the Imperial Company. The conditions as to power to raise money imposed on the metropolitan gas companies in all the Acts passed since 1860 were then specified, to show that in every case no lower maximum than 7½ per cent. was fixed. Appended to the company's appeal was the following declaration of some of the most eminent firms in the City:—

London, July 26, 1866.

We, the undersigned, confidently believe that there will be a great difficulty, if not impossibility, in issuing at par any important number of new shares by the Imperial Gas Company, if the maximum dividend the company is allowed to pay on such shares be limited to 7 per cent.

(Signed) Smith, Payne, and Smith (Bankers).
Mullens, Marshall, & Co. (Governmt. Brokers).
Foster and Branthwaite (Stockbrokers).
James Capel and Co.
P. Cazenove and Co.
Hitchens, Harrison, and Co.
W. E. Tatham and Co.
R. W. Moore and Carr.

The opinion expressed in the foregoing declaration is fully confirmed by the following statement of the rate of interest which may be obtained by investments in the 10 per cent. shares of the metropolitan gas companies at the present market prices:—

Chartered	8·05 per cent.
City of London	7·70 ,,
Commercial	6·94 ,,
Equitable	6·88 ,,
Great Central	8·00 ,,
Imperial	7·14 ,,
Independent	6·66 ,,
London	7·30 ,,
Phœnix	8·08 ,,
Ratcliff	7·14 ,,
South Metropolitan	6·58 ,,
Surrey Consumers	7·59 ,,
Western	6·59 ,,

Excluding the South Metropolitan and the Independent Companies—the former of which has its reserve-fund completed and the latter nearly so—the average is 7·40 per cent., and yet, in the face of this fact, Lord Redesdale continued to insist that the shares of the Imperial Company might be sold with the chance of receiving 7 per cent. on the money invested; for it must be borne in mind that, as the shares are not preferential, if the profits are insufficient to pay the prescribed dividends of 10 per cent. and 7 per cent. both must be reduced *pro ratâ*, which is a contingency that Lord Redesdale appears to have overlooked. The 7½ per cent. shares of the Phœnix Company bear no premium, nor have they done so for some time past; it cannot, therefore, be expected that the 7 per cent. shares of the Imperial Company will be placed at par, and as they cannot be issued at a discount, the present shareholders will be compelled to find funds to carry on their undertaking on terms that must be attended with loss. The Bill of the Imperial Gas Company was not opposed even in the House of Lords, and it seems monstrous that a single individual should have the power to dictate conditions which the public do not require, and of imposing obligations on the shareholders, which they only accept under the most urgent pressure of being obliged to comply with the requirements of their Act. Lord Redesdale appears entirely to disregard the state of the Money Market, and to imagine that it will change to suit his wishes, for the same injustice which seems so flagrant in the case of the Imperial Company has been practised, on a smaller scale, in in the majority of Bills that have come before him late in the session. Though the treatment of the Imperial Company is exceptionally unjust in the metropolis, the provincial gas companies have equal cause to complain, for in most instances the prescribed dividends on new capital have been reduced from 7½ to 7 per cent. It must be presumed, in the absence of other causes for this perversity, that his lordship's vision is clearer and more penetrating than that of other men, and that through the gloom which now darkens all financial affairs he can perceive a brighter prospect in the shortly coming future, when money will be abundant and 7 per cent. gas shares in great demand.

The *animus* of Alderman Lusk towards the London gas companies was sufficiently displayed in the committee of inquiry into the operation and results of the Metropolis Gas Act, and it may be assumed that there is no good intended to them when he makes a stir in matters relating to the supply of gas. In the House of Commons, on Thursday last, he inquired whether it was the intention of the Government to bring in a Bill next session for the better regulation of gas companies, and to amend the Act in accordance with the report of the committee. From the form of the question, it appears that some intention exists of proposing to amend the Gas-Works Clauses Act (1847), as well as the Metropolis Gas Act of 1860. The reply of the Home Secretary was merely that he had not had time to read the report, but that the matter would receive his attention; and there can be little doubt that, in the meantime, efforts will be made to prejudice his mind on the subject.

The letter, in another column, of Mr. W. Richards, who was in 1854 engineer of the Barcelona Gas Company, directs attention to the remarkable immunity from attacks of cholera of all persons connected with those works during the disastrous prevalence of the disease in that city, when the general population were actually decimated by it. His experience accords with that of the managers of gas-works in this country, for only a few of their men were affected by the cholera during the prevalence of the disease in England, and those who were attacked were men of irregular and uncleanly habits. Carbolic acid, one of the products of coal tar, is well known to be a most powerful disinfecting agent, and its liberal use for that purpose is recommended by the highest sanitary authorities. The beneficial effects of the exhalations from gas-works in preventing and checking the spread of infectious disease have been so well established that it seems extraordinary some practical measures, on a large scale, have not been taken to derive the full advantage which such a mode of treatment presents. Gas-works, instead of being the pestiferous places which it pleases some persons to represent, are in fact the most efficient sanatoriums in times of cholera, as was proved at Barcelona, Marseilles, Seville, and other towns on the Continent, and experience dictates the diffusion of similar emanations in cholera hospitals and throughout the eastern district of the metropolis, where the disease is now rampant.

We noticed very briefly in our last number that the Newcastle-upon-Tyne Gas Company had been convicted by the magistrates of that borough for having supplied gas containing more than 15 grains of sulphur in 100 cubic feet, in contravention of their Act. Several technical objections were taken by the solicitor who attended on behalf of the gas company, but they were overruled very summarily by the magistrate. Mr. Pattinson, an analytical chemist, who had been appointed to test the gas, stated that he found the illuminating power to be equal to 15¼ candles, which was better than the Act requires; but, on testing for sulphur, his first experiment gave 25·06 grains, and his second 23·16 grains in 100 cubic feet, the average being 24·11 grains. That determination was calculated from the results of experiments on 2 to 3 feet of gas in each case. In the course of the proceedings it was stated that Townley coal was most free from sulphur, but that it could not be obtained in sufficient quantity, and that the company, having been compelled to use other coals, they were having

additional purifiers constructed to enable them to extract the sulphur more completely, but that, in consequence of the frost and the strike of the men, those purifiers had not been completed. It was contended that that difficulty amounted to an "unavoidable cause" sufficient to exempt the company from being fined for default. The magistrates, however, after a consideration of ten minutes, decided that the offence had been proved, and imposed a penalty of £15. Mr. Pattinson was allowed three guineas for his attendance and five guineas for his experiments, so that, together with other fees, the penalty and costs amounted to £24 6s. 4d. A second information of the same kind was also heard, and decided against the company. The average quantity of sulphur in that case was stated to have been 24·34 grains, and the company were fined £10 and costs, including a second fee of five guineas to Mr. Pattinson. Application was made to the magistrates for a case to carry the question to a superior court, which was granted. This conviction of the Newcastle Company is an instance of the danger gas companies incur by agreeing, in the present absence of knowledge respecting the purification of gas from bisulphide of carbon, to any other sulphur test than the ordinary one for sulphuretted hydrogen. In the Newcastle Company's Bill as deposited, the tolerated amount of sulphur in any form was limited to 10 grains in 100 feet. They were, however, warned of the risk of binding themselves to such an obligation, and they raised the amount to 15 grains. They were at that time using Townley Main coal, one of the purest coals in that district, which yields gas containing less than 10 grains of sulphur; indeed, Dr. Letheby, in a table presented by him during the late metropolis gas inquiry, sets down the quantity in Newcastle gas at only 4·93 grains. The high reputation for purity which the coal acquired, has, however, caused a large demand for it, and the price has been raised so high as to compel the Newcastle Company to employ other descriptions of coal, with the same result that has attended the use of such coals in London. The company are now testing the latest theory as to the purification of gas from bisulphide of carbon, which is a return to dry lime in large purifiers, through which the gas passes at a very slow rate, and remains for a long time in contact with the lime.

Mr. Hughes has been recently called on by the Corporation of Folkestone to advise them respecting the public lighting of that borough, and he has made a report to the Lighting Committee so unfair in its general assertions and in its inferences, that we feel bound to notice the misrepresentations. The first seven paragraphs of the report relate to the condition in which he found the public lamps. The flames of nearly all, he says, were jagged and imperfect, the immediate cause of which was the corrosion and stoppage of the burners from want of cleaning, and owing to the very small calibre of the burners it was extremely difficult to avoid corrosion. He adds that the burners now in use are of the very worst description, that about three-fourths of the lamps when he saw them were not consuming more than 2 feet of gas an hour; that the light from each lamp did not exceed that of 3½ sperm candles; and that none of the burners, even after having been carefully cleaned, would consume a greater quantity than from 3 to 3½ feet of gas an hour, instead of 5. Any one reading Mr. Hughes's report would conclude the defects in the public lighting of which he complains were all attributable to the gas company; but in reality, if the defects alleged exist, the company are blameless in the matter, for the Corporation light, extinguish, and clean the lamps, and provide lamp-posts, brackets, service-pipes, and fittings, and keep them in repair, and the burners are of the pattern prescribed by the Corporation—viz., "Laidlaw's "No. 4 bat's-wing." Of these facts Mr. Hughes could scarcely have been ignorant, though he entirely ignores them in his report. If blame be due to any one, it is to the Lighting Committee and their officers, for having suffered such a state of things as described to last so long.

Having thus represented the condition in which he found the public lamps, Mr. Hughes proceeds in ten succeeding paragraphs to suggest various recommendations to remedy the defects he alleges he discovered. In the first place, he recommends an entire change of system, by supplying the lamps with gas by average meter indication, as provided for in the gas company's Act, which arrangement, he thinks, might be in operation by Michaelmas next, and he suggests that in the meantime some meters should be attached to the present lamp-posts, to afford an indication of the quantity consumed under the existing system, so as to regulate the charge for gas. He considers that when the lamps are supplied by meter with proper burners and "a proper regulating apparatus," 3 feet of gas an hour will give as good a light as the present burners with 5 feet, and that a saving of 27s. per lamp per annum will be effected. On this part of the report we may observe that the company, when their Bill was before Parliament in 1865, at once acceded to the proposition to insert the average meter indication clause, and they have intimated their readiness to assist the Corporation in introducing that system. Whether, under the name of "proper regulating apparatus," Mr. Hughes's hobby of the double tap is to be brought forward remains to be seen; but we may confidently predict that if it be, the example set by Birmingham and other towns, of rejecting it after trial, will be followed at Folkestone. These portions of the report evince clearly enough the unfairness of its general character, but in the succeeding part, when reporting on the illuminating power of the gas, Mr. Hughes lays himself open to a graver charge. He commences by cavilling at the construction of the photometer he found at the works, because the bar was only 60 inches long and the candle moved with the disc, instead of being constructed as in his opinion a photometer ought to be. The instrument is one of Church and Mann's, which is considered by many an improvement on Bunsen's, and the bar of Dr. Letheby's most recently improved photometer is shorter by 10 inches. Setting aside this pragmatical objection to the photometer, there is another point that requires more serious comment, for Mr. Hughes has allowed himself, in the exercise of his judicial functions as gas analyst, to transgress his authority, and to tamper with the apparatus provided in accordance with the requirements of Parliament so far as to render himself liable to judicial proceedings. Armed with the authority which the company's Act gives to the Corporation Mr. Hughes entered the gas-works without notice, and was at once conducted to the photometer-room, and there tested the illuminating power of the gas with the photometer and burner provided by the company in compliance with their Act. The result was not such as he anticipated, for the illuminating power was found to be equal to 15 candles, which is one candle more than required by the company's Act, and considering that 15 per cent. of good cannel was used at the time, the illuminating power was very probably understated. Mr. Hughes's authorized functions then ceased, but he no doubt felt reluctant to have to report to his employers a result so different from what was expected. He then ventured to tamper with the burner, so as to render it incapable of properly consuming the quantity of gas prescribed by Parliament, and having done so he proceeded to make further experiments, knowing beforehand that a diminished consumption would operate prejudicially on the illuminating power. By that proceeding Mr. Hughes violated the Act under which he obtained admission to the company's works, and he ought forthwith to have been shown the door. He was bound, as gas analyst appointed to test the gas, to use the burner provided by the company, if its dimensions and construction were such as required by the Act; and if it were not so, he might properly have protested against it, and refused to make the experiment. He made no objection of the kind, but finding that the results of the experiments were favourable to the gas company, he rendered the burner unfit for the purpose of properly consuming the gas by removing a necessary appendage, and then repeated his experiments, of which he gives the following record:—

In a second experiment without the perforated disc I was unable to consume anything like 5 feet an hour, as the flame rose to a height of 8 inches above the top of the chimney, and seriously smoked at the top of the flame. The mean quantity consumed during this experiment was 4¾ cubic feet an hour, which gave an illuminating power of 11·098 candles, and this for 5 feet an hour is equal to 11·68 candles, or more than two below the parliamentary standard.

In a third experiment, with the flame adjusted to the greatest height at which a consumer could use it, the consumption was exactly 4 feet an hour. The illuminating power for this consumption was found to be 9·69 candles, and this for 5 feet an hour was equal to 12·11 candles, or nearly two candles lower than the parliamentary standard. Each of the preceding experiments comprised ten readings or observations on the photometer bar, and the general result may be thus stated:—1st. That when tested with the perforated disc applied to a burner of the very best description the gas had an illuminating power of exactly 15 candles. 2nd. When tested with the same burner, but without a disc, the power was below 12 candles.

I consider that no consumer using the best commercial Argand burner he can procure, obtains a higher power from this gas than TEN CANDLES.

The *animus* of Mr. Hughes in seeking, in the last sentence of the extract we have made from his report, to disparage the illuminating power of the gas, is so obvious that we are saved the necessity of further commenting upon it; but if he wishes to pursue his researches further in the same direction, we can supply him with a burner, complying in all respects with the

prescriptions of the Act, and warranted to convert 15-candle into 5-candle gas.

The person appointed by a local authority to test the quality of gas ought to be impartial, otherwise little dependence can be placed on his experiments. That Mr. Hughes was not a properly qualified person in that respect his well known hostility to gas companies sufficiently proved, and his illegal tampering with the burner when it would not give the desired result shows how unfitted he is for the office of gas analyst. He was, however compelled to admit that the illuminating power of the gas was higher than the prescribed standard when consumed with the authorized burner, and his consideration of what it might be, if other burners were used, shows to what extent sophistry may be employed to distort the plainest facts. If the public do not use the kind of burners adapted to consume gas properly it is their fault, and it would indeed be to impose a hard condition on gas companies if they were required to supply gas that would burn under all circumstances with equal brilliancy.

A fourth edition of Clegg's "Treatise on Coal Gas" has just been published. The numerous and extensive alterations which have been made in the work to adapt it to the present state of knowledge of the manufacture, distribution, and testing of gas, and the utilization of waste products, show how actively improvements have been going on during the last seven years since the third edition appeared. Many things that have become obsolete are omitted, nevertheless the book has been considerably enlarged, and many new illustrations have been added to render it more complete, while the price has been reduced. A new chapter, on the arrangements of gas-works, including an account of all those in the metropolis, and examples of the largest and smallest of provincial gas-works, will be found a valuable addition to this standard work on gas lighting.

Communicated Article.

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ON DEFECTS IN THE APPARATUS GENERALLY USED FOR THE DETERMINATION OF BISULPHIDE OF CARBON IN COAL GAS, AND DESCRIPTION OF A NEW APPARATUS FOR ITS ESTIMATION.

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It is, I think, very generally admitted that the question of the determination of the exact proportion of sulphur in the bisulphide of carbon form in coal gas assumes every day more importance. Increased observation which I have been afforded during the past few months has further contributed to prove to me the serious defects inseparable from the general arrangement of apparatus, and the usual procedure in manipulation that are at present in use for that purpose. While our processes for the estimation of sulphur remain in this condition, of what reliable value are statements to the effect that, by the adoption of this or that process, nine-tenths of the bisulphide of carbon compounds have been absorbed from the gas subjected to its action, when the apparatus at our disposal, by which we analyze the gas, possesses defects so serious that, unless extraordinary precautions have been taken, sulphur to the extent of 20 to 30 per cent. may probably, and almost certainly, have escaped determination! I have made many attempts, in consequence of this state of our analytical methods, to improve, if not to make quite perfect, an apparatus, together with the subsequent chemical operations of analysis, which should still be convenient in application while effecting this end. The imperfections in the apparatus furnished by Dr. Letheby were alluded to by myself some months since (p. 657 of the Journal of Gas Lighting, for Sept. 5, 1865). In speaking, upon that occasion, of the apparatus devised and recommended by him for ascertaining the amount of sulphur existing in the gas as bisulphide of carbon and such analogous combinations of sulphur, I took occasion to remark—"It is very well known that the apparatus described by Dr. Letheby is not without certain defects when brought into requisition for this purpose." In this paper I have to bring before the notice of those interested in the chemistry of coal gas certain points of great importance, which are entirely associated with this question of sulphur determination. One is in regard to a new and very easily adapted modified arrangement of the apparatus I formerly used,* by which I entirely prevent what has hitherto been considered and admitted by all who have studied the subject to be a source of error peculiar to it by no means insignificant. I here refer to the augmentation of the quantity of sulphur in the first place burned into sulphurous acid, and subsequently detained in combination with the ammoniacal condensed products in the receivers L M (see p. 658 of vol. xiv. of Journal of Gas Lighting); by the retention there likewise of the sulphurous portions always, especially in towns, forming a constituent in more or less proportion of atmospheric air. Now, in the absence of any data in respect to the quantity of these sulphur compounds in the air of various localities, or supposing that their proportions were known, the uncertainty and difficulty that must attend any attempt to ascertain the volume of air which, during the performance of an experiment, would necessarily pass up the trumpet-tube *o w*, and thence through the receivers M L, finally passing out at *y*, it is clear that, while the apparatus, with these defects inherent in its construction, whether the sulphite of ammonium at length obtained in the receivers does not contain a proportion of sulphur always in excess of that which actually existed in the tested volume of gas, must be, of course, a matter of great uncertainty. Barlow and Ellissen (Journal of Gas Lighting, vol. xiii., p. 713), in their report to the directors of the Chartered, City of London, and Great Central Consumers Companies, made in July, 1864, observe in reference to this subject:—"Nor are the processes at present employed for determining the quantity of sulphur so free from sources of error as to justify us in concluding that the whole (sulphur) is arrested by any of them. It is, however, certain that none of them will indicate the presence of a *greater* quantity of sulphur than really exists, if *proper precautions be taken to purify the air necessary for the combustion of the gas*, without which precaution the sulphur present in the air would tend to augment the quantity indicated as existing in gas. In Dr. Angus Smith's investigations on 'The Air of Towns,' the per centage of the volume of sulphurous acid present in the air of Manchester is stated to vary from 0·0011088 to 0·0000264, quantities which, though small, are quite sufficient to be appreciable in the products of the combustion of gas, and this per centage will be greater still in close rooms in which the gas is burnt." It must at the same time, however, be admitted as quite true, that in employing the apparatus defined by Dr. Letheby two sources of error, which have not hitherto been avoided, to some extent counteract each other in a manner tending to produce greater accuracy than would otherwise be attained. Thus it is always found by those who have had experience in the use of the apparatus, that a considerable proportion of the sulphur actually a component of the gas subjected to the examination escapes retention in the receiver, even when a second condenser is added. It will fall within my province, in the course of this paper, to show, by comparing the results obtained with the apparatus as set up under Dr. Letheby's guidance rules, without some improved methods, in the first place devised by M. Ellissen, and in the second place by myself, that the loss of sulphur from various imperfections may be fairly considered as enormous, and it is perfectly well established that this deficiency of so much of the sulphur is principally due to the uncertain and irregular combustion of the gas when the "Leslie" burner is employed to burn it; for with the "single" jet a very steady and uniform flame may be easily maintained throughout the experiment. To the superiority of the "single" jet when substituted for the "Leslie" burner, as furnishing a marked increase in the quantity of sulphur in comparative experiments, we are entirely indebted to M. Ellissen, whose experiments are detailed in the report I have quoted above. I may observe here that all my own experiments, of which I have made a considerable number with every possible care, exhibit a very great loss of sulphur in each instance in which the "Leslie" burner is used instead of the "single" jet to burn the gas. However, the loss so incurred would be more or less compensated for by the increased proportion of sulphur condensed in the receivers, because of the atmospheric sulphurous acid, and possibly in some cases sulphuretted hydrogen, which could not fail to become absorbed in the receivers, especially when strong ammonia had been placed in these vessels. This addition of strong ammonia to the receiving condensers is a proceeding we must by no means overlook, unless we would incur the certainty of a loss of sulphur to an extent far greater than that which at all times, under the conditions described, is quite inevitable. We have a parallel in this case of compensation by increased accumulation of sulphur in the condensers from the sulphur of the air of towns, against loss of it by the defects mentioned as peculiar to the apparatus in the case of the celebrated arrangement of Liebig for the analysis of organic bodies.

Early on in the employment of this application it was found that the carbonic acid obtained through the combustion of the organic body submitted, mixed with the oxide of copper to analysis, uniformly afforded a proportion of carbonic acid lower than corresponded with the actual amount of carbon known to be present in the substance. But at the completion of the process of burning it was necessary to draw atmospheric air through the entire apparatus by an operation of suction, so that none of the carbonic acid remaining in it should avoid absorption by not being transmitted through solution of potassa placed in connexion for that purpose. It was remarked by those who used the apparatus at the outset, as a curious fact, that the small proportion of carbonic acid present in the atmosphere so drawn through increased the weight of the

* See Journal of Gas Lighting, vol. xiv., p. 658.

potassa apparatus to an extent generally closely coinciding with the proportion lost by the peculiar defect incidental to the process itself, and that it was as well, on that account, to neglect adopting a precaution never omitted by some chemists in such analyses—that of first connecting the one end of the apparatus with a tube of potassa before applying suction, so that the atmospheric air, before being drawn through, should be by that means entirely freed from the small quantity of carbonic acid which it always contains.

However this may be viewed as applicable to the question of sulphur determination in coal gas, it is quite certain that the adoption of a system which would conclusively obviate all chance of error of this description is extremely desirable.

My efforts to improve the apparatus as at present employed have led me to make a series of experiments with the view of ascertaining the possibility of burning the gas in an atmosphere where all likelihood of contamination or augmentation of the condensed sulphurous products, by any sulphurous particles contained in that atmosphere, should be thoroughly prevented. Independently of the importance of securing this end, as enabling us to speak reliably and positively at any time regarding the maximum amount of bisulphide of carbon compounds in any certain specimen of gas, I need scarcely allude to the great convenience I have experienced, and which I feel sure others, as well, will find in the arrangement of apparatus I am presently going to describe. With it, sulphur determinations may be carried on in a laboratory where, from operations of other workers, sulphuretted hydrogen or sulphurous acid may be generated without the slightest possibility of absorption of either of these gases from the passage of the atmosphere of the laboratory containing them into and through the receivers of the apparatus.

I may now sum up the results of my experiments at the outset of the details belonging to them, and the conclusions I have arrived at under three heads:—First, a number of experiments have been made in which an exact comparison is shown of the results obtained by burning volumes of gas under the trumpet-shaped tube connected with the two receivers, containing uniform measures of strong ammonia, with the "single" jet and the "Leslie" burner.

Secondly—The results obtained by burning like volumes of another bulk of gas with the "Leslie" burner and Dr. Letheby's arrangement, compared with the same gas burned with the "single" jet connected with my new apparatus, which I call the "Desulphurizer," by the addition of which the atmosphere in which the gas is then burned is absolutely freed from all traces of sulphurous acid or sulphuretted hydrogen.

Thirdly—The final results, as I shall then demonstrate, of a large number of experiments comprised under the above first and second heads, are, that the apparatus used and recommended by Dr. Letheby, and the system of acidification likewise adopted by him, from constantly exhibiting in its action large losses of sulphur—*frequently exceeding* 30 *per cent.*—must be wholly abandoned for this purpose where anything approaching accuracy is sought for by the experimenter.

We must, if we would be accurate, definitively relinquish acidification and oxidation with nitric acid of the ammoniacal sulphite, and take care to employ instead nothing but chlorine for that purpose. There is imminent danger that the sulphate of barium, when precipitated by chloride of barium in the presence of much nitric acid, carries down with it an amount of nitrate of barium, which adheres to it with astonishing tenacity, notwithstanding copious washing with boiling distilled water be afterwards persevered with. Not only have we this source of error to contend with, but in cases where much ammonia has been placed in the receivers, and in consequence a considerable quantity of nitric acid has been added to produce sufficient acidification, a proportion of nitrate of ammonia would then be present in the solution from which we have subsequently to precipitate by the addition of the baryta salt, that must, as I have found, interfere in such a way with the precipitation of the sulphate of barium as to destroy all confidence in the issue of the experiment. To prove how completely all reliability must be misplaced, when reposed upon any experiment conducted upon the nitric acid acidification principle, I must quote the most eminent quantitative analyst of the day, M. Remigius Fresenius, who observes as follows, at page 104 of his last (fourth) edition of the "System of Quantitative Analyis," published recently:—"Sulphate of barium, when recently precipitated, it is difficult to obtain a clear filtrate from, especially *if the precipitation was effected without the aid of heat*, and the solution contains neither hydrochloric acid, nor chloride of ammonium. It is insoluble in cold and in hot water. It has a great tendency upon precipitation to carry down with it other substances contained in the solution from which it separates, more particularly nitrate of barium, chloride of barium, &c. These substances can generally be completely *removed* only after ignition by washing with appropriate solvents. Even the precipitate obtained from a solution of chloride of barium by means of sulphuric acid in excess contains traces of chloride of barium which it *is impossible* to remove, *even* by *washing* with boiling water, but which are dissolved by nitric acid. Cold dilute acid dissolves trifling yet appreciable traces of sulphate of barium: for instance, 1000 parts of nitric acid, of specific gravity of 1·032, dissolve 0·062 parts of sulphate of barium. Cold concentrated acids dissolve considerably more: thus 1000 parts of nitric acid, of 1·167 specific gravity, dissolve 2 parts of sulphate of barium. Boiling hydrochloric acid also dissolves appreciable traces. Acetic acid dissolves less sulphate of barium than other acids. Free chlorine considerably increases the solubility of sulphate of barium. Several salts more particularly interfere with the precipitation of sulphate of barium. I observed this some time ago with chloride of magnesium, but *nitrate of ammonium possesses this property in a high degree.*" Again, page 266, in speaking of the precipitation of sulphate of barium by the addition of chloride of barium to the solution which must be acidified by hydrochloric acid, to *acid* reaction, he says: "Should the analyzed solution contain nitric acid, *some* nitrate of barium *is likely to precipitate in conjunction with the sulphate of barium:* the removal of this admixture of nitrate of barium from the precipitate requires *protracted* washing with hot water. It is, under all circumstances, necessary to continue the washing of the precipitate until the last washings remain perfectly clear upon testing with sulphuric acid. In cases where perfect accuracy is desirable, I would recommend the following proceeding:—After igniting the precipitate, and weighing, moisten it with a few drops of hydrochloric acid; add hot water, stir with a very thin glass rod, rinse the rod, and warm gently for some time. Pour the almost clear fluid upon a small filter paper in a glass funnel, and test the filtered fluid with sulphuric acid. If this produces turbidity or a precipitate, which is a sign that the sulphate contains an admixture of another barium salt, wash the residue (the sulphate) again with hot water, until the washings are no longer rendered turbid by sulphuric acid. Dry now the precipitate, ignite, and weigh. If sulphuric acid has been precipitated from a solution *containing much nitric acid* or *much alkaline salt*, the testing of the ignited precipitate is not *merely* to be recommended, but is *absolutely* necessary, since in such case it is by no means unlikely that the sulphate arium will contain 1 per cent. *or more* of nitrate of barium or aline salt. *The results are not always so exact as used to be be eved. If precipitated in very acid solutions*, a little of the sulphate of barium remains dissolved. If precipitated in very saline solutions, on the other hand, the results are generally too high, since it is difficult in this case to obtain a pure precipitate of sulphate of barium. The sulphate of barium has a great tendency to carry salts (especially nitrates and chlorides) down with it which cannot be removed at all by washing, and are removed but imperfectly often when the ignited precipitate is treated (as above described) with hydrochloric acid and water."

Now, it can be but folly in any analyst who would continue to employ nitric acid as the oxidizing agent with the certainty of sustaining a loss from the contingencies so clearly demonstrated in the above extracts from the work of M. Fresenius. And the small bulk of gas generally at our disposal to be submitted to the burning operation, from furnishing but a comparatively minute quantity of barytic sulphate, obviously makes the chance of error more serious—on the one hand from loss by non-precipitation of some of the sulphate of barium, owing to the presence of much nitrate of ammonium; or, on the other hand, from nitrate of barium adhering obstinately to the sulphate of barium; from which, as we see from Fresenius' experiments, and as I have myself experienced, it is very often quite out of our power to remove it.

It is to this cause that such startling discrepancies in results are so frequently found in many experiments.

In my papers published last year in this JOURNAL, I gave some outline of the way I proceed to estimate the sulphur. I need hardly say that I still employ nothing but a current of chlorine for the oxidation of the sulphite of ammonium into sulphate. It entails no more inconvenience than with the use of nitric acid; and and if it did, if we desire anything approaching accuracy, we must nevertheless continue its use. We can simply and easily effect the desired end on the following plan:—When the contents of the two condensing vessels are drained out, and thoroughly washed clean with pretty hot distilled water, they may be mixed in a capacious vessel with the washings of the cork junctions and the trumpet-shaped tube. All parts of the apparatus with which the sulphurous ammoniacal fumes have come in contact should be repeatedly washed with hot distilled water, until they fail to produce the *slightest* turbidity with dilute solution of chloride of barium after standing at least a quarter of an hour. The mixed solutions must then be cautiously concentrated by gentle boiling in a capacious evaporating-dish. It is necessary to be extremely cautious how we apply the necessary heat, for if we neglect to watch the heating operation, an exceedingly brisk effervescence, resulting from a rapid evolution of carbonic acid from the decomposition by the elevated temperature of carbonates of ammonium, into which the strong ammonia of the receiver has become converted, would cause some degree of loss through particles of the fluid becoming projected over the sides of dish. When the evaporation has been carried so far that only 2 or 3 fluid ounces of solution remain, a beaker-glass is selected in which it is proposed to mix the fluid, when properly treated, with the chloride of barium for subsequent precipitation. Then the solution is carefully poured from the evaporating-dish down a stirring-rod into this beaker-glass; and then what fluid remains adhering to the evaporating-dish is cautiously also transferred into it by one or two rinsings with hot water from a laboratory washing-bottle of the most convenient form.

We need not concern ourselves at this stage to transfer every particle of adherent solution of the dish into the beaker-glass when we have twice washed it out with hot water; for the contents of the beaker-glass being then forthwith treated, while occasionally stirred with a spatula, with a current of chlorine emitted from a glass tube brought as closely as possible to the bottom of the vessel, until the green gas is seen to escape unabsorbed, and form an atmosphere above the liquid, are shortly afterwards again put back into the evaporating-dish. The chlorine should be evolved in a little flask from about half an ounce of good black oxide of manganese, and a little more than sufficient pure hydrochloric acid to cover it, a gentle heat being cautiously applied. An intermediate washing-bottle of hot water must be employed to wash the gas; and the junctions of the tubes may be made with vulcanized india-rubber tubes, which, however, must at least have been used two or three times previously, and where chlorine has been in contact with their inner surfaces. When the beaker-glass and the tube through which the chlorine has been passed into the solution have been rinsed clean and added to the contents of the dish, these are once more concentrated, with careful gentle boiling to expel the chlorine, to the bulk of an ounce or two; and, as the solution usually contains fragments of cork, it is then filtered through as small a paper filter as can be selected for convenient use. The beaker receives the filtered fluid.* Three additions of hot water to the filter after it has drained thorough I uniformly find suffices to free it from all adhering sulphate. We may assure ourselves of this by allowing the fourth addition of hot water from our "wash" bottle to run into a small beaker, into which we have poured the small quantity of chloride of barium intended to be subsequently thrown into the treated solution for the subsequent precipitation. I always find that every trace is so absolutely removed at that stage, that not a particle of sulphuric acid can be found in the final fourth drainings off.

One of the several advantages resulting from the use of chlorine instead of nitric acid is, that with the first we always obtain, after concentration by boiling (to get rid of any free chlorine—a step of the highest importance) and filtration, a perfectly clean limpid fluid, from which, by the addition of the requisite quantity of the barytic precipitant, a precipitate is instantly obtained, which, after heating nearly to boiling for a few minutes, subsides rapidly. Yet we must on no account attempt to collect it on a filter until it has stood at least twelve hours. It never passes through the filter if we provide ourselves with good filtering paper. On the contrary, when we employ nitric acid, we frequently obtain a dirty viscid brown, somewhat turbid, solution. Here we miss the destructive, bleaching action of the chlorine upon organic matters, which always accompany the salts removed from the receivers, &c. That these organic matters, where nitric acid is used, likewise retard the precipitation of the sulphate of baryta, I feel very certain, and that they, together with the nitrate of ammonia, prevent the deposition of some portions of it entirely I know quite well.†

I enter thus very completely into a description of the best mode of proceeding as regards these particular manipulations in estimations of coal gas sulphur, which I always follow, because of my having received from various sources numerous applications upon the subject since the few details I gave thereon in the series of articles published in this JOURNAL last year upon the "Action of the Sulphides of Ammonium upon the Bisulphide of Carbon and Sulphuretted Hydrocarbons in Coal Gas."

Regarding the comparative results obtained in the determination of the proportion of sulphur in the form of bisulphide of carbon or sulphuretted hydrocarbons in a volume of coking coal gas divided in two equal bulks—the first bulk being burned by the "Leslie" burner, and the second consumed by a "single" jet—

Experiment A.—The first half of the volume of gas taken for this estimation was transferred to the gasholder F, figured at pages 569 and 658 of vol. xiv. of this JOURNAL. All in excess of 2½ feet exactly was let off by the surface stop-cock. Rather more than 5 cubic feet had been collected in the largest gasholder, A (p. 569, vol. xiv.), a few days previously, and allowed to stand over water, the level of which was during that period preserved at *e e*. An absorption of gas is generally remarked by such contact of coal gas with a surface of water in a vessel of this description. There is a curious degree of variation in this amount of absorption, however, I have observed, with bulks of gas taken at different times from a company's supply, notwithstanding that the *illuminating power throughout may be extremely uniform in value*. When no more absorption was observed, the 2½ feet was forced from A, through the stop-cock C, connected by a long tube with stop-cock *f*, of the gasometer F, by a head of water joined from the tap H' to the inlet of large holder A into gasholder F, for burning off.

Six hours were occupied by the consumption of this first 2½ cubic feet, and an ample supply of strong ammonia was placed in the bottle underneath the funnel supporting the "Leslie" burner. Two receivers were placed to collect the products of the combustion, each containing two fluid ounces of the strongest solution of ammonia absolutely free from any traces of sulphuric acid. To have conducted the experiment with greater rapidity would have been to sacrifice the advantage desired in this case of maintaining the steadiest flame attainable with this kind of jet, so as to make sure of the highest possible result in the sulphur obtained.

Experiment 1 had been commenced so early in the day that immediately the burning off was concluded the remaining half of the gas in A should be immediately passed into the gasometer F, to be in turn, with as little delay as possible,* measured and burned by the "single" jet.

Experiment B.—To this end, a second set of receivers and another trumpet tube, &c., were provided, but of precisely similar size and construction, so that the whole apparatus should be set up and set going without delay. Two fluid ounces of strong ammonia from the same stock as that used in the preceding experiment were added, as before, to each receiver, and a quantity of strong ammonia similar in bulk to that employed under the funnel in last experiment was placed under the funnel in this. The combustion lasted six hours. In a word, every detail was observed exactly as in experiment 1, with the one exception that the "single" jet burner was used in experiment 2.

The following are the results of these two experiments:—

Table showing Results obtained by burning two equal measured bulks of Coal Gas, one with a "Leslie" Burner, and another with a "Single" Jet; all other conditions in the arrangement of the apparatus (including oxidation with chlorine) being in both experiments precisely similar.

Experiments.	Quantity of Gas analyzed.	Description of Burner.	Weight of Sulphate of Barium obtained.	Amount of Sulphur calculated for 100 Cubic Feet.
A ..	2½ c. feet	Leslie	1·56	8·56
B ..	2½ c. feet	Single jet....	2·17	11·92

Note.—The difference between 11·92 and 8·56 is 3·36, which shows a loss of 39·29 per cent. of sulphur through using the "Leslie" burner instead of the "single" jet.

In the next two experiments a grain or two of bisulphide of carbon were swept into the largest gasholder by the current of gas at the time of filling it from the company's supply. It was then allowed to stand as before, over water for one week, to allow time for thorough diffusion. Two quantities of 2½ feet respectively were then very carefully burned with the same precautions taken in the two last experiments.

Table showing Results obtained by burning two equal measured bulks of Coal Gas, into which a little Bisulphide of Carbon Vapour had been diffused; one portion being consumed with the "Leslie" Burner, the second part being burned with the "Single" Jet.

Experiments.	Quantity of Gas analyzed.	Description of Burner.	Weight of Sulphate of Barium obtained.	Amount of Sulphur calculated for 100 Cubic Feet.
C ..	2½ c. feet	Leslie	2·61	14·33 gr.
D ..	2½ c. feet	Single jet....	4·41	24·22 gr.

Then 14·33 : 9·89 : : 100 : 69·01 per cent. loss through employing the "Leslie" burner.

The whole of the succeeding experiments further made to clearly establish the loss incidental to the use of the "Leslie" burner, are placed in the following table.

Table showing Results of burning two equal bulks of Coal Gas, with, in the one case, the "Leslie" Burner, in the second, the "Single" Jet. About six hours were required for the duration of burning in each experiment.

Experiments.	Quantity of Gas analyzed.	Description of Burner used.	Weight of Sulphate of Barium obtained.	Quantity of Sulphur calculated for 100 Cubic Feet.	Loss of Sulphur per cent. through using the Leslie Jet instead of the Single one.
E ..	2½ c. feet ..	Leslie ..	1·90 ..	10·40	16·15 gr.
F ..	2½ c. feet ..	Single jet ..	2·20 ..	12·08	
G ..	2½ c. feet ..	Leslie ..	1·60 ..	8·76	44·74 gr.
H ..	2½ c. feet ..	Single jet ..	2·31 ..	12·68	
I ..	2½ c. feet ..	Leslie ..	1·32 ..	7·24	97·23 gr.
K ..	2½ c. feet ..	Single jet ..	2·60 ..	14·28	
L ..	2½ c. feet ..	Leslie ..	2·00 ..	10·96	30·65 gr.
M ..	2½ c. feet ..	Single jet ..	2·61 ..	14·32	
N ..	2½ c. feet ..	Leslie ..	1·82 ..	9·96	21·28 gr.
O ..	2½ c. feet ..	Single jet ..	2·20 ..	12·08	
P ..	2½ c. feet ..	Leslie ..	2·20 ..	12·08	23·17 gr.
Q ..	2½ c. feet ..	Single jet ..	2·71 ..	14·88	
R ..	2½ c. feet ..	Leslie ..	1·87 ..	10·24	21·09 gr.
S ..	2½ c. feet ..	Single jet ..	2·26 ..	12·40	
T ..	2½ c. feet ..	Leslie ..	1·61 ..	8·84	48·41 gr.
U ..	2½ c. feet ..	Single jet ..	2·39 ..	13·12	

By adding up the results of the eight experiments in the above table, made with the "Leslie" burner, we obtain the numbers 14·32, which divided by 8 gives the number 1·79 as the mean of the whole. Similarly, the sum total of the other eight combustions gives the figures 19·28, which also divided by 8 leaves 2·41 for the "single" jet mean. Proceeding in the same way with the fourth column of the table—the quantity of sulphur calculated for

* The dish is best brought thoroughly clean by means of hot water and a clean feather on the end of a quill.

† I always experience in precipitating SO_3BaO, after treating as described by chlorine, that we have the solution acidified to a uniform degree in all experiments, which cannot be attained by any other means.

* I have repeatedly satisfied myself that after gas had been allowed to stand a day or two over water in my gasholders, as described, no appreciable alteration of nature occurred to it by remaining there for another day. However, for all this, I never omitted burning the two bulks of gas in one day.

100 cubic feet—we get the average 9·81 grains of the element for the burnings by the "Leslie" burner, and 13·23 grains for those in which the "single" jet was used. If we add together the eight quantities giving the loss of sulphur incurred through the employment of the "Leslie" burner, we have, as the average of this, 37·84 per cent. We obtain, however, the exact per centage of loss through substituting the "Leslie" burner for the "single" jet in the sixteen experimets, as a mean result, by the following calculation:—

	In 2½ feet.	In 100 feet.
Mean of 8 experiments, "single" jet	2·41	13·23
Mean of 8 experiments, "Leslie" burner ..	1·79	9·81
Loss by using the "Leslie"	·62	3·42

Then 1·79 : ·62 :: 100 : 34·63 for 2½ feet of gas.
And 9·81 : 3·42 :: 100 : 34·86 for 100 do. do.

I extract and annex underneath, from the report of M. Ellissen (JOURNAL OF GAS LIGHTING, Oct. 18, 1864, vol. xiii., p. 717), the results of the six experiments made by him to compare the quanties of sulphur determined in a bulk of gas by the "single" jet and "Leslie" burner.

	By "Leslie" Burner.	By "Single" Jet.
1st experiment....	4·31	6·88
2nd do.	5·09	4·96
3rd do.	3·44	4·05
Mean	1·42	1.76

Then the proportion,

1·42 : ·339 :: 100 : 23·76,

shows that slightly above *twenty-three and three-quarters* per cent. of sulphur was lost because the "Leslie" burner was employed instead of the "single" one!

If we take the means of M. Ellissen's first and third experiments, we find that in the place of the above loss, we have a deficiency instead of 41 per cent. in round numbers from the same cause! For the difference between 5·46 (the mean of the "single" jet determinations) and 3·87 (that of the "Leslie" estimation) is 1·59, and 3·87 : 1·59 :: 100 : 41·09. I consider this average to be much nearer the truth—first, because I never yet obtained otherwise, *at the lowest, than from* 16 *to* 20 *per cent. of loss* (as compared with the "single" jet) by using the "Leslie" burner; and secondly, because it so nearly corroborates the considerable number of experiments given in the above tables.

Of the Method of Burning the Gas with the addition of an Apparatus I call a "Desulphurizer," by which any Increase of Sulphur in the Condensed Products from the surrounding Atmosphere is entirely prevented.

I must now refer to the annexed drawings. Fig. 1—*a a′ a″* is a vessel made of sheet iron, with an outlet of half an inch in diameter, capable of being closed by a cork, a little above the bottom at *b*. This vessel is circular; 5½ inches deep, 6 inches across the top (from *a* to *a″*), diminishing gradually in diameter towards the bottom, where its measurement is only 5 inches.

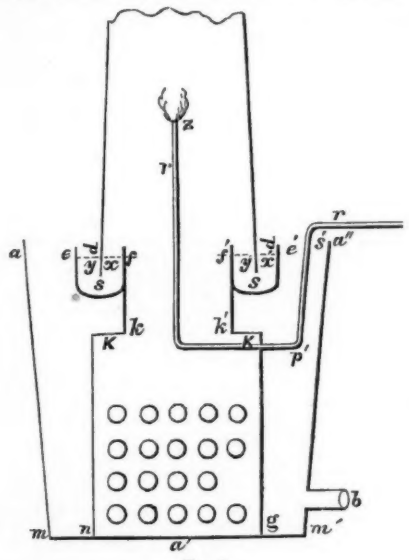


FIG 1.

Fig. 2 shows the interior part of the apparatus, which we must imagine has been lifted out—for it may of course be removed if necessary—of the external vessel *a a′ a″*. It consists of another cylindrical formed vessel K *n* K *g′* of sheet iron, open at the top and bottom at *f f′* and *n g′*. It measures 3½ inches in diameter and 4 inches from the lowest part, *n*, to the upper surface, K. All around the lowest part of this inside cylinder, as high as 3 inches up, but no further, it is punched full of holes, similar to a vegetable colander, of about, or somewhat less, than half an inch

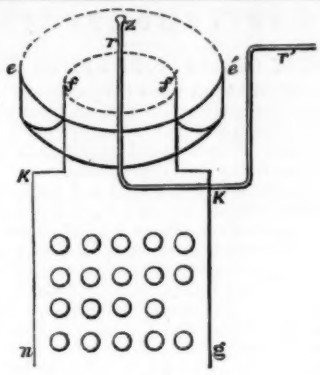


FIG 2.

in diameter. It is turned in horizontally, and vertically again, as shown in Fig. 1 at K K, where it is narrowed at *k k′ f f* to a diameter of 2 inches across. This contracted circular mouth (as I may express it) is cemented perfectly air-tight in a hollow circular glass gutter shown at *e f f′ e′*. This glass gutter is 4 inches across from *e* to *e′*, Figs. 1 and 2, 1 inch wide from *e* to *f*, and 1 inch in depth from *p* to *s*. The office fulfilled by it is to act, when filled with a fluid, as a close joint, when the lower end of the trumpet-shaped tube, *o*, is lowered carefully into it; for as it is, besides being 1 inch in width all round, 1 inch in depth, as these trumpet-shaped tubes are generally made, no difficulty is, I always find, experienced in placing the tube well into the positions shown at *x x′* in the drawing; *r r* is the metal pipe, with a single jet, *z*, attached, through which the gas is conveyed as usual to the inside of the trumpet-tube—projecting up it about 3 inches—for burning. This pipe is soldered into the side of the inner perforated vessel, *n g′* K K, and passes up through the circular orifice (which is of the diameter of 2 inches), *f f′*, to its jet, *z*.

Having described the construction of the apparatus, I will now give an account of the mode in which it is employed to effect the desired end—that of enabling us to determine the sulphur in coal gas, no matter how sulphurous the external atmosphere may be at the time of the experiment:—

The gas being in complete readiness for burning, the interior perforated cylinder, K *n* K *g*, is placed inside the external vessel, *a a′ m m′*. The receivers being charged with the proper quantity of strong liquid ammonia, are then joined to the trumpet-tube, and raised to such an elevation upon the table, that the vessels, with their gas-supply tube, *r r*, may be easily placed in their proper position under the trumpet-tube at any moment. Upon looking at the arrangement made, as sketched in Fig. 2, it will be seen that between the holes of the inside cylinder K *n g* and the inner walls of the outside one, *a a′ a″*, there is a considerable space open, increasing from about three-quarters of an inch at *g* and *n* to about 1¼ inch at the part *p′*, and the same for the corresponding place on the opposite left-hand side and all round the vessel. Every part of this vacancy around and over the holes of the inside cylinder is then filled in and covered to within about an inch of the top of the inside of the exterior vessel with fragments of pumice-stone the size of very small nuts, which have been just before thoroughly soaked in a moderately strong solution of potassa. Lastly, as much strong ammonia is then to be poured into the glass gutter, *e f f′ e′*, as will, when the trumpet-tube is depressed below the surface of the ammonia in the gutter (shown at the dotted level line at *y y′*), by raising the whole arrangement upon blocks until the proper height is attained, suffice to form a completely close ammonia joint, and so prevent any air entering except that which passes, first down into that part of the apparatus *e e′* (Fig. 1), where indicated by the arrows. Thence, in its passage to the interior of the perforated inside, into which a current is instantly established when the gas is lighted, it comes very thoroughly in contact with large surfaces of potassa solution soaked into the pieces of pumice. When it passes upwards as a current of hot air circulates up the trumpet-tube in the direction further shown by the arrows, finally emerging by the orifice *f f′*, on its road to burn the gas at the jet *z*, it has been by that time completely deprived of all sulphurous particles which are capable of absorption by potassa solution.

It is a manipulation of the greatest simplicity when the receivers and trumpet-tube are placed at the required level; and it has been further ascertained, by a trial just previously, how much ammonia need be poured into the gutter-lute to light the jet, and place it beneath the trumpet-tube, out of contact with any but the purified atmosphere, and so commence the combustion of the gas at any desired moment.

I propose in an early number of this JOURNAL to give an account of numerous curiously interesting results obtained by comparing the amounts of sulphur determined with this additional apparatus, with those obtained by employing both the "Leslie" burner and "single" jet as given above.

(To be continued.)

Correspondence.

IMMUNITY OF GAS-WORKS FROM CHOLERA.

SIR,—At the present time, when the public attention is so generally directed to the terrible visitation of epidemic cholera, now prevalent in the eastern districts of the metropolis, it may interest your readers to hear of what would appear to be the immunity of the inmates of gas-works from that disease.

In 1854, during the months of July and August, Barcelona was visited with Asiatic cholera in its most violent form; the number of deaths, which in ordinary times did not exceed on the average 10 per day, was increased by it during a short period to upwards of 200 daily. A large number of the inhabitants fled from the city, closing their shops and houses, and in about seven weeks the remaining population was literally decimated. The epidemic invariably attacked at night, and the patient generally succumbed in three or four hours.

I was engineer of the gas company at that period, residing on the works, and can vouch for the fact, that during the prevalence of the cholera not a single person was attacked by it at the gas-works, and speedily our men acquired such confidence in the sanitary condition of the premises, that they, their families and friends, took up their abode there during the night, sleeping in the retort-house, coal-stores, or anywhere so as to be in the works. The women and children were in the habit of bringing their bed and bedding in the evening, carrying them away in the morning, always presenting themselves with a degree of cheerfulness which clearly indicated the perfect security they felt in passing the night on the premises.

Now, if the number of persons that were continually on the works be considered, and compared with the average mortality of the town, we would have had from 8 to 9 deaths, whereas not a single attack of cholera occurred.

I leave the explanation of this extraordinary phenomenon to those who may be capable of assigning a cause for it. Some may consider it to arise from chance; but this cannot be the case, as it is well known that the gas-works of Marseilles and other places have possessed similar influences under corresponding circumstances. Some persons believe the antidote to consist in the state of the atmosphere in such localities, and if this be correct, then there is a clue for the scientific to adopt means to prevent the dreadful effects of the awful visitation.

WM. RICHARDS.

7, *Regina Road, Holloway, Aug.* 3, 1866.

Register of New Patents.

2893.—EDWARD MYERS, of Millbank Row, Westminster, C.E., for "*Improvements in the arrangements and construction of wet gas-meters.*" Patent dated Nov. 10, 1865.

The first part of this invention relates to improvements in the arrangement of the inlet-passage for the gas to the measuring-drum, in combination with the waste-water chamber. In various arrangements of wet gas-meters it has been usual to pass the gas from the inlet-pipe or passage into the upper part of the waste-water chamber, and from it the gas passes through a pipe or passage into the measuring-drum. And it is well known that in the meters so constructed, when the water is drawn off the unmeasured gas can be readily passed through the overflow-orifice without passing through the measuring-drum.

Now the object of the first part of these improvements in wet gas-meters of this construction, is to prevent any such fraudulent abstraction of the unmeasured gas. For this purpose the inlet-pipe or passage conducts the gas into an internal chamber or passage formed in the upper part of the waste-water chamber, and this internal chamber is in communication with and conducts the gas to the measuring-drum by means of a pipe. Another pipe descends from the internal chamber to considerably below the water-line in the waste-water chamber, such pipe serving to carry off any condensed water from the inlet-passage. A bent pipe is applied to the overflow orifice, which is at the upper part of the waste-water chamber. The lower end of this bent pipe is surrounded by another pipe or cylinder, closed at the bottom but open at the top to permit the waste water to flow into it and up the overflow-pipe. By this arrangement the waste-water line can never descend below the upper edge of the pipe or cylinder which surrounds the overflow-pipe, thus insuring the constant sealing of the lower end of the pipe, which descends from the inlet-passage or internal chamber previously described.

Another of the improvements for preventing the fraudulent withdrawal of unmeasured gas from the waste-water chamber, consists of taking the gas from the inlet-pipe into an internal chamber formed in the upper part of the waste-water chamber into which the gas passes through a valve having a float attached thereto, and when the water in the waste-water chamber descends by accident or design below a certain level or below the overflow-orifice, the float descends and closes the valve in the internal chamber, thus cutting off the passage of the unmeasured gas to the waste-water chamber, and from it to the pipe or passage which conducts it to the measuring-drum. To the lower end of the tube which surrounds the stem of the inlet-valve attached to the float within the fountain-chamber, is fixed a stay or bracket to support the tube in its position and to serve as a guide for the up and down motion of the float.

The second part of these improvements is applicable to wet gas-meters, such as described in the specification of patents granted to William Esson, dated Aug. 27, 1858, No. 1942, and to the present patentee and William Richard Williams, dated June 24, 1863, No. 1592, and in the specification of a patent granted to the present patentee, dated Dec. 8, 1864, No. 3059, and to other meters of a similar character, wherein a supply-fountain is employed; and these improvements relate to the arrangement of the passages which form communications between the water-reservoir and the measuring drum and chamber in which the fountain or air-tube is situated, and in the arrangement of the outlet-passage for the gas from the drum, in order to maintain one uniform level of the water-line in the measuring-drum of wet gas-meters of this description. In the arrangement of compensating apparatus employed for adjusting and maintaining the proper level of the water described in the specifications of the patents before referred to, no provision was made to prevent the frequent unsealing of the air-tube caused by the agitation of the water-line during the revolution of the drum as each quarter or division thereof descends. This frequent unsealing of the air-tube causes unnecessary loss or discharge of water from the reservoir or water-supply chamber, through the overflow-tube, into the waste-water chamber, by which the reservoir becomes rapidly and wastefully exhausted, choking the meter, and thereby defeating the object for which such an arrangement of apparatus is required. An opening of considerable size between the measuring-drum and the air-tube or fountain-chamber, extending above and below the water-line, as described and shown in the specifications and drawing of the patent last referred to, served not only as the means for maintaining the level of the water in the drum and air-tube chamber, but also for the measured gas to pass away through from the drum to the outlet-pipe, so that any agitation of the level of the water-line in the measuring-drum at once affected the level of the water in the air-tube or fountain-chamber, thereby causing the frequent unsealing of the orifice in the air-tube, and the consequent discharge of water from the reservoir, to readjust the level of the water-line in the measuring-drum.

In order to obviate this defect, two openings are formed between the measuring-drum and the air-tube chamber, one orifice being comparatively small near the bottom of the chamber below the water-line, and communicating with the water in the measuring-drum; another orifice or opening of corresponding size, or thereabouts, being formed to make a communication between the drum and the reservoir or water-supply chamber, to adjust the level of the water in the two chambers. Another opening of considerable size is formed in the upper part of the air-tube chamber above the water-line for the escape of the measured gas to the outlet-pipe. By this arrangement of the passages the agitation of the water-line in the air-tube chamber, and the unsealing of the orifice in the air-tube, is prevented.

In place of forming a separate chamber within the front or fountain supply-chamber, as previously described, for the air-tube and overflow-pipe as heretofore in the construction of wet gas-meters furnished with supply-fountains, according to another of these improvements the air-tube and overflow-pipe are arranged within the drum-case behind the back plate of the front chamber. In this arrangement a passage is formed between the upper end of the air-tube and the fountain-chamber, the lower end of the overflow-pipe forming part of the air-tube being arranged so as to communicate with the waste-water chamber by a communicating passage. In place of forming the compound air-tube with two openings for the admission of air thereto, as described in the specification of the patent above referred to, a long oblong is formed from the bottom of the dividing plate to the level of the overflow-passage.

2905.—JOSEPH ALFRED NICHOLSON, of Adelaide Place, London Bridge, London, for "*Improvements in regulating the flow of water and other fluids in pipes and valves, and determining the quantity passing through the same.*" Provisional protection only obtained. Dated Nov. 11, 1865.

This invention consists, first, of a regulator, the rising and falling shaft of which has a hollow chamber formed at the bottom thereof, which chamber is fitted with a piston or ring externally, and also has a flexible back or fluid-holder attached to its lower end. The flexible fluid-holder is placed in a cylinder closed at the bottom, and within which cylinder the piston works up and down. The flexible holder is charged with mercury, oil, water, or other suitable liquid, which passes therefrom into the hollow chamber of the piston-rod and *vice versâ* alternately through a small aperture in the latter as the shaft rises and falls. When the said rod is lowered into its normal position, the mercury or other fluid in the flexible holder passes through the aperture into the chamber and compresses the air within, which thus acts as a spring, and together with the specific gravity of the fluid forces it back again into the flexible holder underneath. Pressure being now applied to the head of the piston-rod it will descend, carrying down the piston and causing the fluid to again pass through the aperture into the chamber, the size of the aperture and quantity of fluid regulating and determining the time of the descent of the piston and the quantity of water or other liquid passing through the pipe and valves connected therewith.

The invention consists, secondly, of a regulator formed as above described, either with or without the flexible fluid-holder, and having a valve fitted in the bottom of the hollow chamber of the piston opening downwards, and allowing the mercury or other fluid to pass freely into the flexible holder or directly into the cylinder as the piston is raised, and slowly back through a small aperture in the valve as the piston descends, the size of the aperture and quantity of fluid regulating and determining the flow and quantity of water in the pipe or valve as before explained. Thus a small quantity of fluid, when suitably prepared, continues to be used repeatedly, and the chamber and holder being hermetically sealed, the introduction of grit or foreign substances which might render it inoperative is guarded against.

Third, in lieu of the valve last described in the bottom of the hollow chamber of the piston, there is formed an opening to receive a pin attached to the mercury or fluid-holder, and rising and falling into and out of the chamber. This pin is made hollow and has a lateral opening in the side near the bottom, and the top part of the said pin is made less than the opening in the chamber, so that when the piston is raised a sufficient height the mercury in the said chamber can flow freely therefrom into the fluid-holder below. When the piston in falling causes the hole to arrive at the large part of the pin, the mercury can only pass from the fluid-holder into the chamber above through the small lateral and ver-

tical hollow in the pin. The opening which traverses the said pin may be lined or fitted with a flexible outer packing ring or cup to keep it tight.

2912.—Peter Ellis, of 9, Orange Court, Liverpool, Lancashire, architect, for "*An improved description of water-closet.*" Patent dated Nov. 13, 1865.

This invention consists of an entirely novel arrangement and an improved construction of water-closet, susceptible of various forms of application, in all forms, having the advantage of cleanliness of appearance, efficiency of action, security against offence, and from the simplicity of the parts, and combination, and the enduring character of the material of construction, permanently secure against disarrangement.

The details of the invention could only be intelligible by the aid of drawings.

2934.—Jules Théodore Anatole Mallet, engineer, of 29, Boulevart St. Martin, Paris, for "*A new or improved process for the manufacture of oxygen.*" Patent dated Nov. 14, 1865.

This invention consists in extracting oxygen from air through the medium of certain metallic chlorides, such as the chloride of copper, &c. The oxychloride of copper obtained by the various chemical means, when heated in a closed vessel at a temperature of from 300° to 400°, evolves oxygen, leaving for residue protochloride of copper, which, on being exposed to the action of air, will absorb some oxygen and again become oxychloride, which is one and the same thing as the material first employed. This material being heated, will again yield oxygen, and so on. The chloride of copper is therefore but an agent for fixing the oxygen of the air, and giving it off in presence of suitable temperature.

The claim is for preparing oxygen by means of the decomposition by heat of the oxychloride of copper, and other like oxychlorides, the solid residue of the operation being transformed anew into oxychloride by the action of atmospheric air.

2935.—Samuel Lawrence Gill, of 4, Campbell Terrace, Bromley, Middlesex, for "*Improvements in gas-stoves.*" Provisional protection only obtained. Dated Nov. 14, 1865.

In constructing a gas-stove according to this invention two vertical cylinders are employed, one within the other. The inner smaller cylinder is closed at the top, and from its sides small tubes pass to the larger exterior cylinder, so that air may pass from the interior of the inner cylinder through these tubes to the atmosphere on the exterior of the outer cylinder. Around the inner cylinder, and near its lower end, is placed a ring of gas-burners, by which these small tubes become heated, and as they are arranged to incline upwards, the air within them, as it becomes heated, ascends and escapes at the outer ends of the tubes into the room or building to be heated, whilst a current of fresh air, either from the room or building, or from the outer atmosphere, enters the lower open end of the inner cylinder to take the place of the heated air which is passing away. The outer cylinder is open at its lower end, and from its upper end there is a pipe or flue leading to the outer atmosphere. The products of combustion from the gas-burners rise to the top of the outer cylinder and pass away to the outer atmosphere through the pipe or flue. The current of heated gases rising up through the outer cylinder induces a current of air from the room or building to enter its upper end through the tube or flue. The impure air from a room or building may thus be carried away at the same time that fresh warm air is supplied to it.

2945.—William Clark, of 53, Chancery Lane, London, engineer, for "*Improvements in the manufacture or purification of hydrocarburets, and especially of petroleum oils used for lighting purposes.*" A communication. Provisional protection only obtained. Dated Nov. 15, 1865.

In performing this invention the raw American or other petroleum is distilled in suitable boilers in order to eliminate the essences, which are distilled at temperatures varying from 100° to 180° Fahr.—that is, all liquids having a density not exceeding 1½ lb. per quart (from 6 to 8 per cent. of the mass to be distilled)—are put aside. The distillation is then proceeded with, and the products separated into two classes—60 per cent. of those first produced, and 30 of those next resulting, are then placed apart in beaters or agitating apparatus. The matters remaining in the apparatus consist of tarry residues, which are afterwards distilled, and will furnish as much as 8 per cent. of lighting oil, being drawn off from the boiler by a cock at the lower part before they become quite cooled. In order to purify the oils separated as above mentioned, and placed in their respective agitating apparatus, there is added to the mass No. 1 from 3 to 4 per cent. of concentrated sulphuric acid, and an intimate mixture of the matters is produced by a continuous and violent agitation for from 1½ to 2 hours. They are then allowed to settle for about 2 hours, and the petroleum is decanted, which is then introduced into a second agitator, to which is added about 2¼ lbs. of the reagent for every 220 gallons. About 22 gallons of water, or preferably milk of lime, are then added, and the whole is agitated for an hour; it is then allowed to rest, and the petroleum drawn off and preserved in well-closed vessels fit for use.

2946.—William Easton, of Gateshead, Durham, for "*Improvements in the construction of pumps for raising water and other liquids.*" Patent dated Nov. 15, 1865.

This invention is applicable to all pumps where engine power is required to raise large quantities of water, as in the case of collieries. The improvement takes place in that part of the pump which in large colliery pumps is called the spears, on the column on which the bucket hangs and works. According to this invention, these spears are abolished, and in their stead an apparatus is substituted which in appearance is a long hollow tube or closed and hollow ram, the length of which is equal to the length of the ordinary spears, and its breadth being regulated by the breadth of the pump-barrel. Generally it will be required of sufficient diameter to displace one-half of the water which the pump-barrel will contain. It requires to be fixed at both ends just as the ordinary spears are fixed. The bottom end is attached to and is immediately over the bucket; the other end is attached to the engine apparatus overhead in the ordinary way that spears are so attached. This hollow tube or ram is required to be water-tight, and made of light material, so as not to exceed the weight of the ordinary spears—the lighter it is made, the greater advantage over the spears. The motive power of the engine is required in the same amount for both up stroke and down stroke of the pump, being a great improvement on the present mode of working colliery engines in relation to these pumps. A pump so constructed is enabled to raise at each stroke of the engine an equal quantity of water in the same time as twice the quantity is ordinarily raised by one stroke, thus effecting the same result with half the engine power.

2965.—James Harbert, of Kidderminster, Worcestershire, gas-fitter, for "*Improvements in the production or manufacture of gas for heating or illuminating, and in the retorts and apparatus employed in such manufacture.*" Patent dated Nov. 17, 1865.

The first part of this invention relates to improvements in the production or manufacture of gas for heating or illuminating purposes by the combination of certain materials, from which several separate descriptions of gas are obtained, which are afterwards mixed together in suitable proportions, whereby a compound gas of highly illuminating quality is obtained at a very trifling cost compared with the ordinary carburetted hydrogen or common coal gas.

For the purpose of carrying out this part of the invention, three descriptions of gas are, by preference, manufactured in separate retorts from a combination of the following materials:—

First, equal quantities or thereabouts are taken by weight of lime and soda or other cheap alkali. These are mixed with sufficient water to cause the mixture to assume the consistency of thick whitewash. This mixture is run into pans, by preference, made of cast iron, which are then placed in ordinary gas-retorts, or in such retorts as are hereafter described, and which are raised and retained at a red heat for about two hours, or until it is ascertained that the whole of the gas has been given off from the mixture.

The second description of gas employed in combination with the other gases, according to this part of the invention, is made from a mixture of ordinary gas or other tar and oil, in the proportion of one gallon of tar to one pint of pine or other cheap oil, such as petroleum or mineral oil, which materials are mixed together and supplied to the retort, by a pipe from a cistern placed above the retort, in suitable quantities from time to time, as required for conversion into gas.

The third description of gas employed is produced from a mixture of lime taken from the lime purifiers, and a strong solution of soda or other alkali in the proportion of about two pecks of lime to about one quart of the strong alkaline solution. These materials are deposited in pans which are placed in the retorts and retained at a red heat until the whole of the gas is driven over.

The several gases thus produced are conducted from their several retorts into an hydraulic main common to all the retorts, ordinary coal gas being also conducted into the same main, where the several gases mingle together in about equal proportions, the quantity of common coal gas being by preference in excess of either of the other gases. The mixed gases are conducted from the hydraulic main to the condenser, and through the lime or other purifiers in the manner well known and practised, the gas being also passed through coke or peat, and other materials.

The second part of the invention relates to improvements in the construction of the retorts and in the condensers employed in the manufacture of gas for heating and illuminating purposes. The improved retorts are by preference formed of a flat oval section and put together in two longitudinal parts or halves, having transverse supports, cast or formed thereon, at suitable distances apart, to support and prevent the central part of the retort from sinking or giving way when highly heated; or the supports may be cast separately either in one or in several parts, or they may be moulded from and made of fire-clay if desired. The two halves of the retorts are made by preference, one with a rib and the other with a groove along the edges, which come together so as to fit, and thus form a joint to connect the two parts; straps and bands of wrought iron being bolted or otherwise fastened thereon, to secure the parts together. The central supports thus formed on, or arranged to support the retorts, are of considerable thickness near the centre, compared with the supports nearer the ends, and are of such shape as to form bearings or supports for the upper series placed over them. The retorts may, if desired, be made of clay, furnished with iron mouthpieces. The transverse supports form part of the arrangement of the flues when the retorts are set, and serve to conduct the heat and products of combustion from the furnaces in a more uniform manner than heretofore in ordinary gas-retort settings, preventing the destructive effects of local heating. These retorts may be arranged in series of three or five, to obtain the most advantageous results. Retorts thus constructed may be of considerable length, and fitted with doors so as to be charged from each end if desired. In order to prevent the explosion of retorts when drawing the charge, the back end is furnished with a pipe and stop-cock or cap, so that the gas remaining in the retort can be burnt out by opening the cock or by removing the cap, and then applying a light before the end of the retort is removed.

The gas is conducted from each retort of a series from the front ends upwards through a bent pipe, one end of which passes away into an hydraulic main common to the whole series of retorts. The gas from the hydraulic main is conducted into a condenser, which it is preferred to construct in the following manner:—A tank or vessel of considerable length is formed with a series of transverse chambers or compartments, into and through which the gas is conducted by inlet and outlet pipes from one chamber to another in succession, until it has passed through the whole series. These chambers or compartments are surrounded and covered with water, which is caused to flow gently through the tank or vessel, to cool the chambers through which the gas is conducted. Currents of air may be substituted for the water, or employed in combination therewith, if desired. The gas, after it leaves the condenser, passes through a bed formed of coke, from which it passes through another bed made of the residuum from the lime previously used in the retorts, and with fine ashes sifted from the furnaces. The gas then passes through the ordinary lime purifiers to the gasholders.

2968.—WALTER PAYTON, of 70, Sewardstone Road, Victoria Park, London, for "*Improvements in means or apparatus for measuring the passage or flow of liquids, for raising and forcing fluids, and for obtaining motive power; also in means for the manufacture of parts of such apparatus.*" Patent dated Nov. 17, 1865.

In carrying out the first part of the invention, axes are employed within a chamber formed of two cylinders, one axis being applied to the centre of one part cylinder and another axis to the centre of the other part cylinder. Upon each of these axes vanes are employed, extending from near the axes to the periphery of its part cylinder. These vanes, in place of being radial, are of a curved form, the curve gradually progressing from near the centre to the outer extremity, and is such that the vanes of one axis may work in between those of the other and yet maintain continuous proximity one with that part of the other whilst other of the vanes are at their outer edges in, or nearly in contact with their respective interior cylindrical surfaces of the case. The ends of such vanes move freely through, in, or nearly in, contact with the case. The axes are geared together. Water or other liquid acting on these vanes will cause their rotation, by which a motive-power engine is obtained, and each rotation of them will form a measured quantity, which may be indicated by index apparatus applied to one of the axes. By giving motion to the axes to cause the rotation of the vanes, a gas-exhauster and pump or apparatus for raising and forcing fluids is obtained. In these cases a foot-valve or valves may be used. The second part of the invention relates to means or apparatus for the manufacture of the parts of such apparatus.

2972.—FREDERICK WILKINS, of 254A, Oxford Street, London, for "*Improvements in apparatus for the production of hydrocarbon or other vapours, parts of which apparatus are also applicable to measuring gaseous or fluid matter.*" Patent dated Nov. 18, 1865.

According to this invention there is applied to the inside of each compartment of the drum of the cylinder of ordinary wet gas-meters or other like apparatus, horse-hair, coke, fibre, sponge, or other fibrous, porous, or textile material. The drum is then charged with volatile hydrocarbon liquid with or without a portion of water or other fluid, and is caused to revolve by weights, springs, or other motive power applied to the axis thereof, causing a current of air or gas to pass through or between the fibrous or porous materials contained in each compartment, by which they become saturated with the liquid, thus rendering it available as a substitute for common coal gas. Other liquids may be used for other purposes. The drum or parts thereof, and also parts of the case containing the same, are covered with flannel, linen, or other textile or porous material for the purpose of retaining the liquid in contact with the current of air or gas more effectually than would be done by the smooth metallic surface of the drum. The drum is also made rough or embossed, or needles or teeth are applied to the surface for the like purpose. Cement or sand is also applied to the surface of the drum for the like purpose. When used for lighting, the air or gas may be conveyed through pipes like gas to the burners.

APPLICATIONS FOR LETTERS PATENT.

1888.—MARC ANTOINE FRANÇOIS MENNONS, of the firm of Mennons and Telescheff, home and foreign patent agents, of 8, Southampton Buildings, in the co. of Middlesex, and 27, Rue Laffitte, Paris, in the empire of France, for "*Improvements in the mode of and apparatus for generating gas for lighting, heating, and other purposes.*" A communication. July 20, 1866.

1889.—FRANCIS JOSEPH ROWLEY, of St. John Street, in the parish of St. Sepulchre, in the co. of Middlesex, gas-fitter, for "*Improvements in gas-pendants, gaseliers, and gas-brackets.*" July 20, 1866.

1955.—CHARLES DENTON ABEL, of 20, Southampton Buildings, Chancery Lane, in the co. of Middlesex, patent agent, for "*Improvements in apparatus for regulating the supply of water and other fluids to steam-boilers and other receptacles.*" A communication. July 28, 1866.

1997.—GEORGE CAMPBELL, of 26, Leadenhall Street, in the City of London, for "*Improvements in apparatus for raising aëriform and other fluids.*" A communication. Aug. 2, 1866.

GRANTS OF PROVISIONAL PROTECTION.

1827.—WILLIAM GLASSFORD WALKER and ROBERT FRAZER SMITH, both of Kilmarnock, in the co. of Ayr, N. B., for "*A certain improved method of producing illuminating gas.*" July 12, 1866.

1889.—FRANCIS JOSEPH ROWLEY, of St. John Street, in the parish of St. Sepulchre, in the co. of Middlesex, gas-fitter, for "*Improvements in gas-pendants, gaseliers, and gas-brackets.*" July 20, 1866.

INVENTION PROTECTED FOR SIX MONTHS BY THE DEPOSIT OF A COMPLETE SPECIFICATION.

1888.—MARC ANTOINE FRANÇOIS MENNONS, of the firm of Mennons and Telescheff, home and foreign patent agents, of 8, Southampton Buildings, in the co. of Middlesex, and 27, Rue Laffitte, Paris, in the empire of France, for "*Improvements in the mode of and apparatus for generating gas for lighting, heating, and other purposes.*" A communication. July 20, 1866.

NOTICES TO PROCEED.

756.—JOHN FREDERICK BRINJES, of Fieldgate Street, Whitechapel, in the co. of Middlesex, engineer, for "*Improvements in machinery or apparatus for distilling bituminous shale and other bituminous substances of a like nature.*" March 13, 1866.

787.—THOMAS JOSEPH READER, of 17 and 20, Cullum Street, Fenchurch Street, in the City of London, for "*Improvements in force-pumps.*" March 16, 1866.

814.—ALEXANDER ANGUS CROLL, of Coleman Street, in the City of London, civil engineer, for "*Improvements in arranging conduits or channels for the reception of gas, water, and other mains, tubes, or pipes, and telegraphic wires, also for the conveying away of smoke or noxious vapours from buildings and for the ventilation of buildings and other places.*" March 19, 1866.

827.—WILLIAM EDWARD NEWTON, of 66, Chancery Lane, in the co. of Middlesex, civil engineer, for "*Improvements in the process of and apparatus for distilling petroleum and other mineral oils.*" A communication. March 20, 1866.

1338.—ORLANDO BROTHERS, of Blackburn, in the co. of Lancaster, gas engineer, for "*Improvements in governors or apparatus for regulating and controlling the pressure and flow of illuminating gas or other gaseous fluids.*" March 10, 1866.

1348.—ALFRED VINCENT NEWTON, of 66, Chancery Lane, in the co. of Middlesex, mechanical draughtsman, for "*Improved apparatus for manufacturing illuminating gas.*" A communication. May 10, 1866.

PATENT SEALED.

274.—WILLIAM WILLMER POCOCK, of Craven Street, in the city of Westminster, architect, for "*Improvements in gas-meters.*" Jan. 27, 1866.

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, JULY 23.

The following Bills received the Royal Assent:—The BRIDGE OF ALLAN WATER; the WALKER AND WALLSEND UNION GAS; and the WANDSWORTH AND PUTNEY GAS.

GLASGOW CORPORATION WATER Bill.—The Queen's consent was signified, and the Bill reported, with amendments.

The GREENOCK WATER, and the GREENOCK AND SHAWS WATER Bills, were read the third time, with the amendments, and passed, and sent to the Commons.

TUESDAY, JULY 24.

The SHEFFIELD WATER Bill was returned from the Commons, with the amendments agreed to.

THURSDAY, JULY 26.

The WEARDALE AND SHILDON DISTRICT WATER Bill was returned from the Commons, with the amendments agreed to.

FRIDAY, JULY 27.

The GREENOCK AND SHAWS WATER, and the GREENOCK WATER Bills, were returned from the Commons, with the amendments agreed to.

The GLASGOW CORPORATION WATER Bill was read the third time, with the amendments, and passed, and sent to the Commons.

MONDAY, JULY 30.

The following Bills received the Royal Assent:—The SHEFFIELD WATER; the WEARDALE AND SHILDON DISTRICT WATER; the GREENOCK AND SHAWS WATER; and the GREENOCK WATER.

THURSDAY, AUGUST 2.

The GLASGOW CORPORATION WATER Bill was returned from the Commons, with the amendments agreed to.

The IMPERIAL GAS COMPANY (No. 3) Bill was read the third time, with the amendments, and passed, and sent to the Commons.

HOUSE OF COMMONS.

MONDAY, JULY 23.

The SHEFFIELD WATER Bill was agreed to, as amended by the Lords.

THURSDAY, JULY 26.

The WEARDALE AND SHILDON DISTRICT WATER Bill was agreed to, as amended by the Lords.

FRIDAY, JULY 27.

The GREENOCK AND SHAWS WATER, and the GREENOCK WATER Bills, were agreed to, as amended by the Lords.

WEDNESDAY, AUGUST 1.

The GLASGOW CORPORATION WATER Bill was agreed to, as amended by the Lords.

THURSDAY, AUGUST 2.

REGULATION OF GAS COMPANIES.

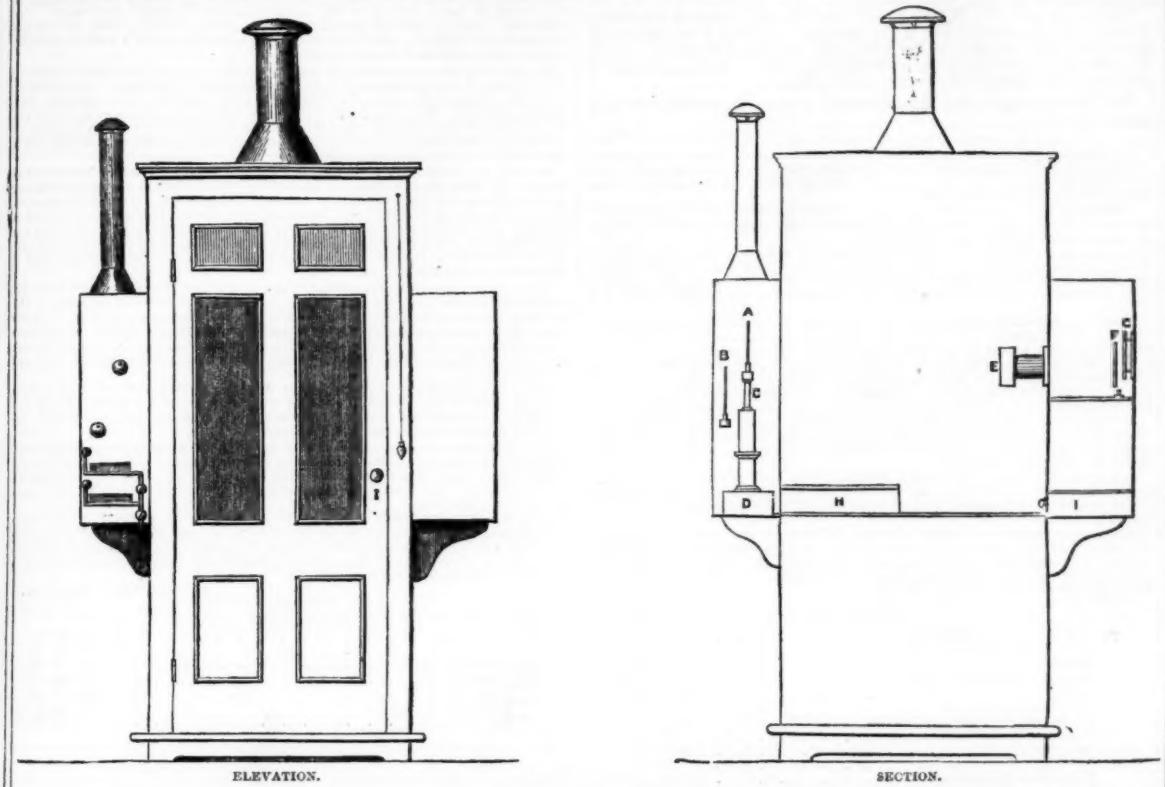
Mr. LUSK: I wish to ask the Secretary of State for the Home Department whether it is the intention of Her Majesty's Government to bring in a bill next session for the better regulation of gas companies; and, if so, to amend the Gas (Metropolis) Act (1863), in accordance with the report of the select committee appointed to inquire into the operation and results of that act.

Mr. WALPOLE: In answer to the question put to me by the honourable gentleman, I have to state that I have not yet had time to read the report of the select committee, and therefore I am unable at the present moment to give him any information upon the subject; but I may say that the matter shall have my attention during the recess.

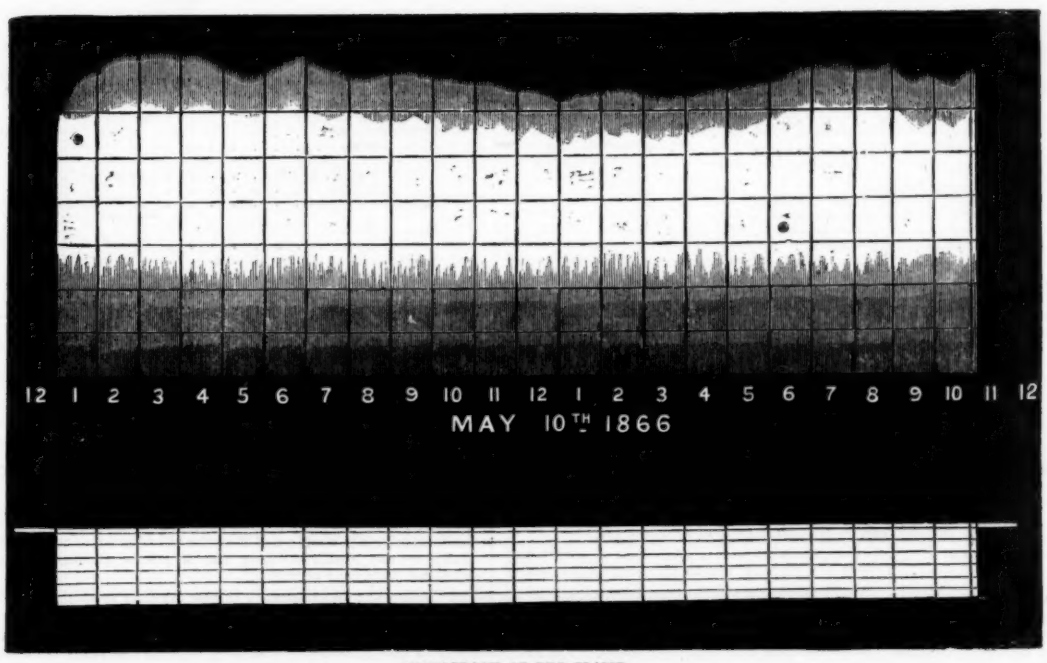
GAS EXPLOSION IN THE CITY OF LONDON.—Yesterday morning two men, engaged upon the Holborn Valley Improvement Works, entered a vault or cellar attached to one of the demolished houses in Skinner Street, for the purpose, it is supposed, of removing a gas-pipe. Whether they took a lantern with them, or on entering struck a match, is not known, but it appears that an explosion instantly took place, which did considerable damage to the houses at the back in Turnagain Lane. The men who caused the explosion fortunately escaped with slight wounds, but two persons who were passing along the street at the time were so severely injured that they had to be removed to St. Bartholomew's Hospital.

KIRKHAM AND SUGG'S SELF-REGISTERING PHOTOMETER.

(See the description in the paper read by Mr. Barlow, before the British Association of Gas Managers, reported at p. 534 of the JOURNAL, *of June 26, 1866.)*



ELEVATION. SECTION.



PHOTOGRAPH OF THE FLAME.

The vertical lines represent hours; the horizontal ones in the lower portion indicate the pressure in 1/10ths of an inch; and in the upper portion each line represents 1 inch. The hours and date are printed by the instrument at the same operation.

PRESENTATION TO MR. G. GARNETT.—The directors and shareholders of the Ryde Gaslight Company, in recognition of the services of their manager, Mr. Garnett, have just presented him with a valuable tea and coffee service, of London make, supplied by Mr. Barnad, of Pier Street. On the teapot was the following inscription:—"Presented (with a purse of fifty sovereigns), by the Ryde Gaslight Company, to their engineer and manager, George Garnett, Assoc. Inst. C.E., to commemorate the remodelling of their works, and the incorporation of the company by Act of Parliament. July, 1866." And on the reverse, the castle and motto of the company. All the articles have the motto and castle engraved on them, and on the reverse a monogram, with Mr. Garnett's initials very tastefully arranged. This is alike creditable to the company and to Mr. Garnett.

PRESENTATION TO MR. H. GOOD, LATE OF CANTERBURY.—A very gratifying testimonial was last week presented to Mr. H. Good, the late manager of the Canterbury Gas-Works. It consists of a handsome silver salver, supplied by Mr. Dobell, and a purse of 30 guineas. The inscription on the salver is:—"Presented with a purse of 30 guineas to Mr. Harry Good by 125 subscribers, in testimony of their high esteem and appreciation of his worth as engineer and manager of the gas and water company, in the city of Canterbury, and their regret at his leaving them after a residence of 26 years amongst them." The testimonial was presented in a comparatively private manner, but the good feeling unanimously displayed throughout the city to Mr. Good must be as gratifying to him as it is well deserved.

CITY OF LONDON GASLIGHT AND COKE COMPANY.

The Half-Yearly General Meeting of this Company was held at their Office, Dorset Street, Salisbury Square, on Wednesday, August 1—ROBERT ALEXANDER GRAY, Esq., in the chair.

The SECRETARY (Mr. Millar) having read the advertisement convening the meeting, the corporate seal of the company was affixed to the register of proprietors. The minutes of the half-yearly meeting held on the 7th of February last, and of the special meeting on the 26th of June (to consider a bill then before Parliament), were read and confirmed.

The following report and the statements of accounts annexed were then presented:—

Dorset Street, Aug. 1, 1866.

Gentlemen,—In their last report your directors referred to certain bills about to be brought into Parliament, which, if carried into effect, would have seriously interfered with the provisions of the Gas Act of 1860, by which the metropolitan companies have of late years been regulated.

As respects two of these bills—viz., "The London Railways Gas Company's Bill" and the "Metropolis Gas Act Amendment Bill"—the promoters decided not to persevere, and the notices were withdrawn.

In the case of the third, to which they specially referred—viz., "The City of London Corporation Gas Bill"—your directors report that on the second reading in the House of Commons it was referred to a select committee of twelve members, with instructions to them to inquire into the operation and results of the Act of 1860.

The committee sat for many days, and decided that the preamble of the Corporation Bill was not proved—Parliament thus refusing to recognize the principle that corporation funds should be allowed to compete with private capital.

Your directors bear testimony to the unwearied and persevering efforts of the committee to carry out the instructions given to them respecting the operation of the Act of 1860, but they feel it is incumbent on them to protest against the report which was presented to the House of Commons as the result of the inquiry.

At the close of the case in support of the alleged necessity for such inquiry, the chairman of the committee intimated to the counsel who represented the companies that it was unnecessary to call witnesses in reply, and that they might safely leave their case with the committee.

Acting on this suggestion counsel refrained from calling witnesses, distinctly stating at the same time that they were prepared with evidence fully to refute the allegations made on the other side, and only waived doing so in deference to the expressed opinion of the chairman.

Under these circumstances your directors feel there is much cause to complain that the report of the committee thus founded on *ex parte* evidence, contains statements highly prejudicial, and, as they consider, unjust to the metropolitan companies and the more so as the proceedings of the committee show they were far from being unanimous on the several clauses.

With respect to the bill for amalgamating this company with the Chartered Company to which you gave your sanction at the special meeting held for the purpose on the 26th of June. Your directors report the select committee of the House of Lords to whom it was referred decided after a very short inquiry that it was expedient to proceed with it this session; this decision it is presumed was the result of the House of Lords having on the second reading rejected a bill which the Chartered Company had introduced for the purpose of enabling them to acquire land at Hackney Wick, notwithstanding that both bills, after a most searching inquiry had passed the House of Commons.

It will be in the recollection of the shareholders that at the special meeting held in June it was announced that the banking-house of Price and Co., of which your late esteemed treasurer, Sir Charles R. Price was the senior partner, had stopped payment. In consequence of this circumstance your directors have opened an account for the company with Messrs. Barclay and Co. In referring again to the event, your directors record their deep regret that it should so soon have been followed by the death of their friend.

The accounts for the half year, duly audited, are appended hereto. The rental is £56,852 17s. 10d., being a decrease of £848 0s. 6d. on that of the corresponding period of 1865; the profit for the six months is £17,446 14s. 5d.; and the amount now at your disposal is £23,018 12s. 10d. subject to income-tax, also to any further payment that may be required on account of parliamentary proceedings the bills not yet having been delivered, and to the loss which will be sustained through the failure of the bankers above referred to, and which the directors have not considered it needful to deal with at present.

These results, apart from the special circumstances just referred to, your directors consider satisfactory, especially when they state that the loss to the company in the half year from the reduction in the price of gas last Christmas, together with the sum paid on account of parliamentary expense amount to nearly £8000, in addition to which upwards of £1200 has been paid in additional wages, your directors having found it necessary to accede to an application from the stokers and other workmen for an advance.

Out of the amount at your disposal your directors recommend you to declare a dividend for the half year as follows:—On the A and new shares at the rate of £10 per cent. per annum, and on the B shares at the rate of £4 per cent. per annum, the whole to be paid as usual, free of income-tax.

Your directors have now to report that the additions made to the plant account, during the last few years, have reduced the floating capital of the company very far below what is required to work the concern with advantage, and they recommend you to authorize them to issue the remaining 2000 new shares according to the company's Act of Parliament.

Your directors close their report by stating that the meeting will have to elect two directors and one auditor, in the place of those gentlemen who retire by rotation. As you have been informed, they are R. A. Gray and R. Kenneth, Esqrs., directors, and J. T. Hadland, Esq., auditor; they are all eligible for their respective seats, and offer themselves for re-election.

R. ALEX. GRAY, Chairman.

No. 1.—*Statement of Profit and Loss, for the Half Year ending Midsummer*, 1866.

Dr.		*Cr.*	
To Cost of coals consumed, including porterage	£26,632 16 9	By Rental	£56,852 17 10
Rents, rates, and taxes	1,298 16 7	Coke	10,857 15 6
Wages	10,543 8 10	Breeze	949 6 3
Directors and auditors fees	654 12 0	Liquor	785 10 0
Salaries	2,555 0 0	Tar	2,118 0 0
Tradesmen's accounts	5,530 15 1	Old materials, &c.	361 18 1
Repair and depreciation of meters	1,211 10 6	Transfer fees	3 10 6
Petty cash disbursements	676 6 4		
Interest	1,607 17 1		
Bad debts, allowances, &c.	361 16 0		
Parliamentary expenses	1,609 4 7		
Balance	17,446 14 5		
	£71,928 18 2		£71,928 18 2
		Balance of profit brought down	£17,446 14 5

No. 2.—*General Balance-Sheet.*

Dr.			*Cr.*		
To Capital		£336,000 0 0	By Plant		£310,910 14 7
Debenture bonds, with interest to date		61,478 19 6	Leasehold property		4,407 0 1
Contingent-fund		5,360 10 3	Amount due for light	£26,655 15 5	
Mr. Benham's benevolent-fund		1,087 10 0	Ditto coke, &c.	4,586 1 0	
Debts to sundries		25,985 7 2	Ditto sundries	7,659 8 7	
		£473,912 6 11			39,201 5 0
Balance carried down—			Amount of cash on hand	£6,387 16 2	
Brought forward from Christmas, 1865, less amount voted to company's officers, and income-tax	£ 5,571 18 5		Ditto petty cash	6 9 10	
Half year's profit, per No. 1	17,446 14 5		Ditto bills receivable	1,318 14 6	
		23,018 12 10			7,713 0 6
			Stock on hand—		
			Coals, &c.	£ 7,963 7 1	
			Materials	2,655 17 8	
			Meters	24,079 14 10	
					34,698 19 7
		£496,930 19 9			£496,930 19 9
			Balance of profit brought down		£23,018 12 10

We, the auditors of the City of London Gaslight and Coke Company's accounts for the year 1866, having examined those accounts from Christmas, 1865, to Midsummer, 1866, do find them to be correct as above stated, leaving a balance of twenty-three thousand and eighteen pounds twelve shillings and tenpence, subject to any variation in the value of the company's vested property and to the income and property tax; also to any further charge on account of any parliamentary expenses, and to any loss which may be sustained in consequence of the failure of Sir Charles Price, Bart., and Company. As witness our hands this thirty-first day of July, 1866. } JOHN THOMAS HADLAND. WILLIAM FORTESCUE.

The CHAIRMAN: Gentlemen, you have heard the report and accounts read. If you desire to put any questions in reference to them, I shall be glad to reply.

Mr. BRUSHFIELD: I see you take credit in the accounts for £26,665 due for gas. Is that amount entirely for rental during the past quarter?

The CHAIRMAN: No; it is the quarter's rental and the balance remaining unpaid from Lady-day. This is the amount due to the company at Midsummer.

Mr. BRUSHFIELD: I do not wish to raise any discussion on the subject of "bad debts," but I scarcely think this item is satisfactory.

The CHAIRMAN: It is only £300 on a rental of nearly £60,000.

Mr. BRUSHFIELD: But you are not like some other companies. You live in a respectable neighbourhood and ought not to make bad debts.

Mr. WILLOUGHBY: I noticed that in the accounts there is an item of parliamentary expenses, £1600, and that the report states there are some further expenses of that kind in prospect.

The SECRETARY: This £1600 is the amount we have paid, and we are now waiting for the parliamentary agent's bill to ascertain the balance due.

Mr. WILLOUGHBY: I understood that in connexion with the inquiry into the Act of 1860 we were associated with the other metropolitan companies in bearing the expenses. I cannot help thinking that this is a large sum, especially as, having been very much in the committee-room of the House of Commons, I saw very little of counsel.

The CHAIRMAN: The opposition cost £10,000, which was divided among the several companies.

Mr. WILLOUGHBY: Still I cannot help thinking this is a very large item, more particularly as we did not ourselves call any witnesses.

The CHAIRMAN: £400 of the amount was incurred in connexion with our own bill.

Mr. WILLOUGHBY: I understood that bill was promoted by the Chartered Company.

Mr. WARD: There were three bills—first of all the Corporation Bill, which we opposed; then there was the bill promoted by the Chartered Company for power to acquire a new site; and then the bill to sanction the amalgamation, so that if we escape with anything like £1600 for parliamentary expenses, we shall not have done very badly.

The CHAIRMAN: Gentlemen, it is now my duty to address a few observations to you in relation to what has transpired during the past half year. And in the first place I must be permitted to express my regret that the attempt to amalgamate this company with the Chartered was defeated, and defeated in a way which I think reflects no credit upon those who were instrumental in its rejection. The accounts laid before you to-day are, we consider, very satisfactory, and I hope the proprietors to whom I am now addressing myself will be of that opinion also. The reduction which has taken place in the price of gas would have inflicted a loss upon the company of about £6000, but for the increased consumption of gas, which has been sufficient to reduce that amount to about £800. I think if the corporation of London would allow the companies to conduct their own business in their own way, without subjecting them to those vexatious proceedings to which the report has referred, the period would much more speedily arrive which they profess to be anxious to see, when a further reduction of price would of necessity take place. But the corporation, in their desire to get rid of the Metropolis Gas Act, have involved us, and all the other companies in London, in a very heavy expense, nearly £10,000 having been expended in opposing their bill. This is a very grievous infliction upon the companies, for I need not say to you that there is not a company in the metropolis the directors of which do not feel an earnest and sincere desire to reduce the

price of gas as early as they can consistently with the duty they owe to the proprietors themselves. My deliberate opinion, as I have said, is that if the corporation would allow the companies to pursue their own mode of conducting their business, the time is not far distant when in all probability a further reduction will be made. The accounts laid before you to-day must, I think, afford you satisfaction, and I trust we shall continue to go on prosperously, but certainly very much will depend upon the manner in which we are treated by that very influential body called the corporation of the City of London. I will just give you one instance of the line of conduct they have pursued. Not content with what they could do themselves to annoy the gas companies, they have gone so far as to invite other local authorities to join them in their vexatious proceedings. This great corporation have so far demeaned themselves as to beg the different metropolitan and other vestries to come forward and assist them to do an act of injustice to the companies, promising that they themselves would defray all expenses connected with their so doing. I am not lawyer enough myself to decide the point, but it occurs to me that they have laid themselves open to a prosecution for conspiracy. I do not know whether my friend, Mr. Ward, is of the same opinion, but I confess that I for one should be glad to see them prosecuted to the utmost. Let me read to you a letter which the corporation sent round to all the vestries.

Guildhall, E.C., March 13, 1866.

Sir,—The House of Commons having decided to appoint a select committee to inquire into the operation of the "Metropolis Gas Act, 1860," and an opinion having been expressed in the House that the corporation of the City of London should be the parties to bear the expense of that inquiry, I have to inform you that the Court of Common Council have resolved that the special Gas Committee should be authorized to communicate with the metropolitan vestries and district boards, with a view to obtain from them such information as they may be able to render, and to take such other steps as may be deemed advisable to promote the inquiry into the operation of the "Metropolis Gas Act, 1860," which is about to be made before a committee of the House of Commons.

In pursuance of the resolution of the court, the special committee wish to know whether your vestry is desirous of rendering assistance by furnishing evidence as to the quality and price of the gas supplied, or as to any other cause of complaint within the district under its care.

It might be advisable for each vestry (if it thought proper) to appoint a small committee to confer with the special committee of the corporation. In doing this it should be distinctly understood that no pecuniary liability would be incurred by your vestry, the corporation having determined, in accordance with the opinion expressed in the House of Commons, to employ counsel and bear all other expenses connected with the inquiry.

The committee will feel obliged by your laying this communication before your vestry at its next meeting.

I am, sir, your obedient servant,

F. Woodthorpe.

I am sure, gentlemen, you will all feel as I do, most indignant that such a letter should have been sent round, not only in the metropolis but throughout the country. The report has stated very correctly that the chairman of the select committee, apparently with the concurrence of those associated with him, stated at the close of the case by the corporation that it was quite unnecessary for the gas companies to call evidence; from which it was reasonably inferred that the committee did not consider the parties on the other side had proved their case. Relying upon that statement in the fullest faith that there was nothing we were required to answer, you may judge of our astonishment when we saw the report subsequently presented to the House of Commons. I shall not occupy your time by referring to the evidence adduced on this inquiry, but of this I am perfectly convinced, that if our witnesses had been examined, as they would have been but for the intimation we received from the committee, our opponents would have been driven quite out of court. Our counsel thought that our case stood so well that it would be better to refrain from calling evidence to rebut the statements made on the other side, and that in fact to do so might have an injurious effect, as it would be acting contrary to the opinion expressed by the committee that such evidence was unnecessary. The report was presented and a debate took place in the House of Commons. It was very warmly supported by those in favour of the corporation, and as warmly and consistently opposed by those who saw the injustice which was intended towards the gas companies. Your attention has been called to the bill promoted by the Chartered Company, to enable them to complete the purchase of land at Hackney Wick, in which this company was interested by the proposed amalgamation; and in reference to the site I may state that the chairman and some members of the committee went down to Hackney Wick and examined it for themselves, and they reported that it was admirably adapted for the purpose, and that they could not for one moment suppose any possible injury would be inflicted by the works upon Victoria Park. The chairman of the committees made a very good speech, and the effect was, that under all the circumstances it had a considerable majority in the House of Commons on the third reading. The bill then went up to the House of Lords, where, upon the second reading, it was thrown out by a combination of some of the bishops. Anything more disreputable I never knew in my life, and I tell you why I say so. The bishops had an undoubted right to endeavour to throw the bill out if they thought the evidence adduced in its favour was insufficient to support it; but here they have passed sentence before trial. Whether that is the way in which bishops usually administer justice I cannot say, but I know that in this instance they have inflicted a very grievous wrong. If, upon an inquiry such as generally takes place before a committee of the House of Lords, their lordships had come to a decision adverse to us no remarks would have been made by me upon the subject, for they have an undoubted right to judge for themselves in the matter; but to condemn us unheard was a most unwarrantable proceeding. Perhaps I ought to apologize to you for having said so much, but I thought it my duty to let you know how it was the bill did not pass. My friend Mr. Willoughby very truly said that we have incurred a heavy expenditure upon this inquiry. The fact cannot be denied, and every one who is at all acquainted with such matters knows that there is not a set of men anywhere more liberally paid than counsel, particularly those who practise before parliamentary committees. And now, gentlemen, I have to refer to another subject, and that is in relation to the death of Sir Charles Price. I explained at the special meeting how it was that we came to have so large a balance in his hands. The persons who ship coals for us draw upon us at the end of each month, and there were several bills very near maturity, for which we had provided, but the bank failed just before they were due. I had no idea whatever that my friend's affairs were in a state of difficulty. We all respected him and respected his father before him. The late Sir Charles succeeded his father in 1847, and became our treasurer. It is due to the memory of our departed friend I should say that whenever we wanted assistance, which was not very often, he was always most ready to afford it. That being the case we kept a good balance, and I believe from what I have heard that if we are permitted to retain the shares which stand in the name of Sir Charles Price, it will considerably reduce our claim upon the estate. But under no possible circumstances do I anticipate a greater loss than £3000 out of the £7000 which was the balance we had in the bank. Since the failure we have opened an account with Messrs. Barclay, who, I believe, every one will consider just as safe as the Bank itself. I have very little more to say to you, gentlemen. My period of office will expire when I have finished my speech, and it will depend upon you whether it is my last speech or not. I may just add that, with regard to the issue of the new shares, the report has informed you that we have 2000 at present unissued, and it is the intention of the directors to allot to each £150 holder one new share at par. In that way every one of the proprietors will participate in the advantage, the shares being now at a premium, and I hope you will be satisfied with the decision at which the board have arrived. You will each receive notice, at no distant day, of the number allotted to you, and a time will be fixed for payment of the call upon the shares. It will be for you then to say whether you will take them up or not. The call will not be made earlier than the beginning of September, and under the provisions of our Act of Parliament we cannot call up more than £5 per share in any one year.

Mr. White: I believe the shares are £10 each.

The Chairman: Yes. We were authorized to issue 10,000 "new shares." We thought it advisable at the time to reserve 2000 till we required the money. We now think it better to distribute the shares amongst the proprietors. With these remarks, gentlemen, I will move—"That the half-yearly report of the directors now read be received and adopted."

Mr. Hadland (deputy-chairman): I have much pleasure in seconding the motion.

Mr. Brushfield: Before you put the question, sir, I should like to offer a few remarks. I am not going to find fault with the report, which I think is a most excellent one, and, considering the reduction which has taken place in the price of gas, the results of the last half year's working appear very satisfactory. I am sorry, however, to find, sir, that your mind has been ruffled again by the circumstances which have occurred in the last half year. I hope, notwithstanding, that you will live through all these trials, and that we shall have the pleasure to see you occupy that chair for many years to come. I think I speak the sentiments of every proprietor, when I say that we shall all be grieved when Robert Alexander Gray ceases to occupy his present position in this company. I quite sympathize with you in reference to what has taken place in the House of Lords, and I think it was a most strange proceeding altogether. I should very much regret to see any injury done to Victoria Park, but for my part I do not at all believe that the erection of the gas-works of the Chartered Company on the site proposed by their bill would have had any injurious effect whatever. One of the proprietors has spoken of the expense incurred in parliamentary proceedings this year. That gentleman may consider himself well off that the company did not proceed further, for every day would have added to that expenditure. The injustice done to the gas companies generally by the report of the committee of the House of Commons is so gross as to be acknowledged by every person, whether connected with the companies or not. I have conversed with a great many persons upon the subject since the report was presented, and I have not met with any one of a contrary opinion. The chairman of that committee expressed himself at various times during the progress of the inquiry in such terms that I am sure every one who heard what he said, or who has since read his remarks, must suppose that he was almost annoyed with the kind of evidence which was being tendered against the gas companies. And upon an inquiry of that kind, what is the natural conclusion when the chairman of a committee intimates that they do not require evidence on the other side? Clearly, that in the opinion of the committee the parties already heard have made out no case. I believe that was the impression of every one who watched the course of this inquiry; and, when the report of the committee was presented, they were perfectly astounded at the conclusions which had been arrived at. I do not believe a more unjust report could have emanated from any body of men. With reference to the opposition of the City of London, I think the corporation have acted in a most despicable manner, and I am sure the intelligent and reflecting portion of their fellow-citizens will acknowledge that their representatives have not conducted themselves in that honourable and upright way which they ought to have done. If a body of men ever did anything to injure the character of local self-government, the corporation of London are certainly chargeable with that very sin. What have they done? Instead of attending to the duties they have to perform, and seeking to maintain the high position which the City has so long occupied in the eyes of the world, they have stooped to interfere with the legitimate course of a commercial undertaking. They have listened to the advice of men not capable of telling the truth, or, at all events, not careful about telling untruths, who themselves care nothing about the interests of the citizens of London, and who, if they could, would make the Common Council a ladder to climb up by, even though they cause them to be regarded as the dupes of one of the most flagrant acts of deception ever practised. For these men know as well as it is known to us that it is impossible to erect gas-works anywhere, or to carry on the business of a gas company anywhere, without incurring the same sort of expense and risk that this and all other companies have had to bear. There is scarcely a company in the metropolis which, at the outset, did not carry on their operations quite as a speculation, and for many years probably received not a single farthing in the way of return for the capital invested. And even at this very moment the holders of gas shares are not sure that some new invention may not next week be discovered which will materially damage their property. But these people who oppose us object to our getting 10 per cent., altogether losing sight of the risk and labour and anxiety through which we have gone for years before we were able to reach this standard. They would do us an act of injustice, and endeavour to push us off the board that they may occupy our places, and taking advantage of the position which as the result of experience and long toil we have attained, endeavour by some contrivance or other to make gas cheaper than we do. There was a time in the history of the world when one of the greatest cities of antiquity, the city of Rome, stooped to act somewhat in the same way, though, perhaps, they were a little more magnanimous in the matter. But they began to dabble in certain things till at last they actually put up and sold the purple of Rome by auction. The citizens of London might well take example from ancient Rome. It is not only true that individual men pass into a state of second childhood, but even cities and towns and municipalities; and it would be well for the corporation of London to look to themselves in this matter. I could wish with all my heart it were possible for the corporation and those who have been abetting them to have one or two years experience in the management of gas-works, for I am sure they would then be of a different opinion to that which they seem at present to hold. They have been foiled in their recent attempt to interfere in our affairs, and I hope they may be better advised, so that they will not again adopt a similar course; but, at the same time, I almost fear that, having once had their fingers in, they will be persuaded once more to meddle with and disturb and damage our interests, without, as I sincerely believe, in the least benefiting the citizens should they attain the object they seek. It only serves the interests of the parties who are edging them on, and who go about the country endeavouring to persuade people how much cheaper gas might be supplied

than it is now supplied by the companies. I know that many of the citizens of London exceedingly regret that these things have taken place, and that the Common Council do not attend more closely and zealously to their legitimate business.

Mr. WILLOUGHBY: I quite agree with what has fallen from the last speaker with reference to the recent parliamentary inquiry, and I consider the conduct of the corporation was utterly contemptible. I was in the room all the time, and it was manifest to every one that the whole thing was got up by a parcel of agitators and speculators, who had everything to gain and nothing to lose. It was nothing more nor less than an attack by them upon the gas companies, out of which they hoped to get something; and I think the committee were of the same opinion. I agree in the remark made in the circular sent round by the directors, that the inquiry instead of injuring us will do us good in the end, but I cannot agree in the observation of the chairman, that the report of the committee is injurious to our interests. In one respect particularly I think we are not likely to be injured, and that is, that we are not likely to be brought into competition with another company. So far as that is concerned our position is benefited. For my part, I am far from regretting the inquiry; it must have come sooner or later, and it is better to have it over and done with. I did not understand that the committee said they would not hear our witnesses; indeed, I thought one witness —Mr. Baxter—was examined on our side.

The CHAIRMAN: That was principally with reference to financial matters, and had nothing to do with the management of the works or the quality and price of gas.

Mr. WILLOUGHBY: One would naturally think, if the committee said they were satisfied with the evidence, it was a little unfair to adopt the report they did; but I did not quite understand it in that way. I do not agree with the chairman in the remarks he made about the amalgamation bill, and I regret the remarks he made about the bishops. I have every reason to suppose they acted conscientiously, and would not give a vote unless they really believed they were doing right in so voting. I think the chairman did not fully inform the proprietors of what took place. In the first place, there was a bill brought in by the Imperial Company, seeking power to erect works within 400 yards of the Victoria Park. That bill was thrown out, and the Chartered Company's was subsequently brought in. The majority of the committee agreed that this latter proposed an appropriate site, and that the works might be placed there. But as I understood the debate, the House of Commons said they were precluded from giving an opinion whether it was desirable, for having referred the matter to a committee they had no right to dispute the conclusion arrived at. It was chiefly on that ground that the report of the committee was adopted. When the bill came before the House of Lords, their lordships were, of course, not bound by the recommendation of a committee of the Commons, but had to decide the matter for themselves. There was a clergyman in the neighbourhood of the proposed site who agitated very strongly against our going there, and I am not surprised at it, for no one likes to have a nuisance brought close to him. This clergyman said it was in the interests of the poor that he acted, and that he could not get a hearing in the House of Commons.

The CHAIRMAN: He was there himself, and was examined as a witness.

Mr. WILLOUGHBY: I think the amalgamation bill was objectionable in principle. We are doing very well at present, the best proof of which is the report which has been read.

Mr. BRUSHFIELD rose to order, and

The CHAIRMAN said it was inconvenient to discuss the provisions of the bill, which was now done with, and could not be revived without the sanction of the proprietors.

Mr. WILLOUGHBY said, if the chairman ruled that the matter could not now be discussed, he must bow to the decision, but he hoped if another bill of the kind were promoted, the shareholders would have the opportunity of knowing what was in it before coming to the meeting to decide upon it. With reference to the remarks made upon the conduct of the bishops, he would be glad if the chairman would withdraw them; but if not, he hoped it would go forth to the world that one proprietor protested against them.

The CHAIRMAN said the honourable proprietor was perfectly in order in protesting against them if he thought right, but he (the chairman) had only stated facts, and he doubted whether any man in England who considered them would justify the course adopted. As far as the position of the proposed new works of the Chartered Company was concerned, there was not the slightest pretence for saying they would have been a nuisance, or that the least inconvenience could have arisen from them. But even supposing that, upon a fair inquiry, and after hearing the evidence on both sides, the Legislature had come to the conclusion that injury to Victoria Park would arise by allowing those works to be erected, of course the company would have quietly bowed to their decision. With regard to the question of nuisance, the chairman quoted, at some length, from the evidence of barristers residing in the Temple, given on the inquiry upon the City Gas Company's Bill in 1859, to prove that not the least nuisance had arisen from the proximity of these works to their chambers, and that no deterioration had taken place in the value of property in the locality. Referring to the conduct of the corporation, the chairman read an extract from a speech delivered by Lord Taunton in the House of Lords, in which his lordship said: "The way in which the affairs of the metropolis were managed was a scandal to the country. He believed there was no instance in the world of so great a city being managed in this way; there was no unity of action; everything was left to chance; and the consequence was that enormous sums of money were wasted." That being the case, the conduct of the corporation towards the gas companies was not much to be wondered at.

The SECRETARY, in answer to the remark made by Mr. Willoughby, quoted from the parliamentary proceedings the reply made by Mr. Burke, when the chairman said, as far he gathered from the committee, they were satisfied as far as the evidence had gone. Mr. Burke said: "Receiving that intimation from the committee, they would feel it their duty, of course, to limit their evidence in accordance thereto. On the other hand, if they had not received an intimation from the committee that they were satisfied with the evidence under this point, there being a large body of evidence brought forward on the other side, they would have felt it their absolute duty to rebut that evidence."

After some further conversation, the motion for the adoption of the report was put to the meeting, and carried unanimously.

Mr. LAVANCHY said a resolution had just been put into his hands, and in rising to move it he must be allowed to express his regret that their long known and highly respected friend Mr. Hardwick, who was to have submitted it, had been compelled from the heat of the room to withdraw and leave it to him to propose. The motion was—"That agreeably to the recommendation contained in this day's report of the board of directors, a dividend out of the profits of the concern, for the half year ending at Midsummer last, be now declared as follows:—On the A and new shares at the rate of £10 per cent. per annum, and on the B shares at the rate of £4 per cent. per annum. The whole to be payable free of income-tax, at the company's office, on the first Tuesday in October next, and on each succeeding Friday and Tuesday, between the hours of twelve and one o'clock." In submitting this resolution he would only say that he felt, as he was sure all the proprietors present must feel, the greatest satisfaction at the results disclosed by the report as to the business of the last half year, and that notwithstanding all the difficulties the directors had had to encounter they were able on this occasion to recommend the usual dividend of 10 per cent. So favourable a state of things could hardly have been expected remembering the reduction which had taken place in the price of gas, and the loss which the company had sustained through the failure of their late treasurer. The proprietors were under great obligations to the directors for the prudent management of the affairs of the company which had tended so much to the benefit of the undertaking.

Mr. PERRY seconded the motion, which was put, and carried unanimously.

Mr. WARD said the report informed the meeting of the intention of the directors to issue the remaining "new shares," and he had now a resolution to propose on the subject. Of course the directors were always desirous of not creating more capital than they could profitably employ, and he thought if the proprietors would take the trouble to look through the accounts of the company they would be of opinion that the board were acting with discretion in the course they now recommended for adoption. To carry on a business of such magnitude the present amount of floating capital at their disposal is very small, as is shown by the statements; and the directors therefore felt justified in advising the proprietors to adopt the following resolution—"That the directors be, and they are hereby empowered, to issue the remaining 2000 new shares authorized by the company's Act of Parliament." They were obliged to issue the shares in the manner authorized by the Act of Parliament, which enacted that the "new shares" should be allocated amongst the holders of original shares or of shares held in substitution of them. Of course the original shares were not now in existence, and the shares issued in substitution were the A and B shares, and though it was true they were limited to a dividend upon the A shares of 10 per cent., and upon the B shares of 4 per cent., the only way in which they could allot these "new shares" was to give one for every £150, whether A or B.

Mr. HADLAND seconded the motion. He said it was so manifestly to the interest of the proprietors to take these shares at par, that it did not require any recommendation on his part to induce them to agree to the resolution.

The motion was unanimously adopted.

Mr. LEWIS said he had the pleasure to move the re-election of their esteemed chairman, whose term of office had just expired. He should consider it almost an insult to the meeting if he were to attempt to add one word by way of recommending the adoption of the motion, and therefore would at once propose—"That Robert Alexander Gray, Esq., be re-elected a director of this company."

Mr. WHITE said he most heartily seconded the motion. There could not be two opinions upon the point that, with Mr. Gray as their chairman, they had the right man in the right place.

The motion was very cordially adopted.

Mr. BRUSHFIELD proposed the re-election of Mr. Kenneth, which was seconded by Mr. FENN, and unanimously agreed to.

On the motion of Mr. WALMISLEY, seconded by Mr. PERRY, the retiring auditor, Mr. J. T. Hadland, was re-elected.

Mr. PERRY then moved the following resolution—"That the meeting hereby records its full appreciation of the services rendered by the chairman and directors in conducting the affairs of the company, and especially in their exertions to protect its interests in the recent parliamentary proceedings, and tenders to them their best thanks for the same." He said he could fully endorse all that was said in the resolution, and even go much further in praise of the efforts of the board, to whom he felt that the proprietors were under the deepest obligations.

Mr. LEWIS seconded the resolution, which was very heartily responded to.

The CHAIRMAN, in acknowledging the vote, said he was very much gratified at this renewed expression of the confidence of the proprietors. For himself, he could only anticipate that the time was rapidly approaching when, in the order of nature, he would cease to be the chairman of this company. He would, however, assure them that so long as his health and their confidence enabled him to hold the office, he would yield to no man alive in sincere and hearty regard for and in efforts to promote the interests of the company.

Mr. KENNETH returned thanks for his re-election, and said it was very gratifying to him to feel that the proprietors approved of his past services. This expression of their kindness would stimulate him to renewed exertions to secure the prosperity of the undertaking.

Mr. BRUSHFIELD said there were other persons connected with the company whose services ought not to be overlooked on an occasion of this kind, when, despite of the difficulties they had had to encounter, they were able to pay a dividend of 10 per cent. If there was one point upon which he could sympathize in the remarks of Mr. Willoughby in reference to the proposed amalgamation it was in this, that he did not like to enter upon any fresh arrangements which might have the effect of disturbing old associations. This company were privileged in having a most attentive and zealous secretary; they were also served by officers of great intelligence and activity in their several departments, who deserved some mark of respect at the hands of the proprietors. He had, therefore, much pleasure in moving a vote of thanks to the secretary and the officers of the company generally.

Mr. PERRY seconded the motion.

The CHAIRMAN, in putting it to the vote, said he cordially agreed in the observations which had been made by the mover as to the conduct of the officers of the company, who were fully entitled to the thanks of the meeting.

The motion was unanimously adopted.

The SECRETARY said: On the part of the officers, and on my own behalf, I beg most sincerely to thank the directors and the proprietors for their honourable mention of our services. Some of us have been connected with the company for many years, and it is gratifying to us to see the concern prospering notwithstanding the contingencies to which it has been exposed. I think the honourable proprietor (Mr. Willoughby) has spoken to-day under some little misapprehension, and I believe that ten minutes in my office would set all his views right. I have had the pleasure of knowing him and his father for many years, and am glad to see that the family are still numbered amongst the proprietors of the company. I again thank you for your recognition of our services. I think the directors and proprietors know that at all times they can command those services most entirely and heartily.

A vote of thanks was then given to the auditors, and was responded to by Mr. J. T. Hadland.

Mr. WALMISLEY, referring to the fate of the Chartered Company's new site bill in the House of Lords, said that upon the division it appeared the numbers "for" were 26, and "against" 27, but on the following day when

the votes were printed the numbers for and against were discovered to be equal—26. The bill was therefore lost only in accordance with an ancient rule of the House that when the numbers are equal the question under discussion is resolved in the negative.

A vote of thanks was then given to the chairman for presiding, and the proceedings terminated.

SMYRNA IN DARKNESS.—A Smyrna letter of the 16th says:—"A gas strike continues to be our great local question of the day—and of the night. Mr. Gandon, the director of the gas-works, cut off the supply from the street-lamps about a month ago, after the failure of his efforts to obtain payment of the heavy arrears due to the company. The step was further compelled by the attempt of the Emlak to reduce the price from 850 p. to 500 p. per lamp."

TERRIFIC EXPLOSION OF NAPHTHA.—Mr. Alfred Langshaw, druggist, Bolton, recently received a barrel of naphtha, containing about 26 gallons, from a lorry. The barrel was put in a narrow passage adjoining the shop, a tap was placed in it, running the naphtha in a tin vessel, and then pouring it into a large storing cask, in a small and confined yard. The capacity of the cask was about 100 gallons. Whilst engaged in this work he was called into the shop, and had unfortunately left the naphtha running into the can. Immediately opposite where the barrel stood in the entry there is a cottage which was then occupied by three persons. One of them, a young woman named Nancy Tempest, seeing that the can was full of the dangerous liquid, and running over on the ground, ran for Mr. Langshaw. Both instantly returned, but the naphtha on the ground had then ignited, and the flame was hastening to the barrel swiftly. He then seized the barrel, struggled for a few moments, but was unable to get it away. The fire reached it, and in a moment the barrel was blown over a cotten waste warehouse occupied by Mr Lowe, and fell in a passage. The passage being only about a yard and a half wide, the flames set the cottage on fire. A bed in one corner on the ground floor was speedily consumed, and all the furniture, flooring, and stairway were in a blaze instantaneously. The borough fire brigade and engines were speedily at the scene of the sad occurrence, and with an immense power of water drowned the fire, but the flaming liquid could not be extinguished, and ran down the passage a sheet of flame into the main sewer. As soon, however, as the fire had been subdued, the efforts of the firemen and others were next directed to the dead or injured. The body of Mr. Langshaw was found lying in the doorway of the cottage opposite the spot where the barrel had stood. Every article of clothing was burned off his body, and his watch lay at his side, being stopped exactly at 20 minutes to three o'clock. Everything inside the dwelling was burned. In the corner near the remains of the bed knelt the body of the occupier of the house. His wife having apparently fled upstairs for safety was found there. Both were dead. Several men who ran down the passage to render what assistance they could were caught by the burning liquid, and rushed back into Deansgate, their clothes being on fire—two of them being on fire from head to foot. The flames were smothered by persons near, and the injured taken to the infirmary. The names of the dead are:—Alfred Langshaw, druggist; John Spencer, 55 years of age, partially a cripple; Ann Spencer, his wife, 52 years of age, who was engaged washing at the time of the occurrence. Of the men who offered to render assistance William Cross, a painter, of Blackhorse Street, is the most seriously injured; next to him Michael Canavan. Both are badly burned about the middle of the body. Cross is not expected to live. Another man known as Tom Seth, had the lower portion of his legs burned. Nancy Tempest (who ran for Mr. Langshaw), niece to the occupier of the house, had her arm burned. Nothing is yet known as to how fire got to the naphtha, but it is supposed that the vapour arising from the naphtha penetrated the dwelling, and ignited on coming near the fire-grate, and that the flame got to the spilled liquid and spread to the barrel. The yard door was on fire at one time; had the fire got to the other side of the door there was the 100 gallon cask, and the results would have been more disastrous.—*Manchester Courier.*

Share List of Metropolitan Gas Companies.

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum	Price per Share.
	£		£ s d	£ s d	£ s d
8000	10	Anglo-Romano . .	10 0 0	9 0 0	11 to 13
5000	20	Bahia (Limited) . .	20 0 0	4 0 0	16 10 0
1000	20	Do., preference .	20 0 0	10 0 0	27 10 0
750	20	Do., do., redeem.	10 0 0	10 0 0	12 10 0
30000	5	Bombay (Limited) .	5 0 0	£5 intr.	4 to 4¼
10000	5	Do., third issue .	4 0 0	£5 intr.	3 to 3¼
10000	20	British, Limited (Norwich, Hull-Sculcoates, Hanley, Tunstall & Sheiton (Potteries), Trowbridge, & Holywell.)	20 0 0	10 0 0	28⅜ to 28½
12000	50	*Chartered*	50 0 0	10 0 0	63½ to 64
6000	50	Do.	35 0 0	10 0 0	42 to 42½
10000	20	*C. of London*, Ash.	20 0 0	10 0 0	26 to 28
10000	10	Do., B shares	10 0 0	4 0 0	7 to 7⅛
8000	10	Do., new shares.	10 0 0	10 0 0	12½ to 13½
25000	25	City of Moscow (L)	17 10 0	£7 intr.	11½ to 13½
		Colonial & General			
17490	25	*Commercial*	25 0 0	10 0 0	36 to 37
8000	20	Continental G. & W.	6 0 0	6 0 0	
2500	20	Continental Union.	20 0 0	8 0 0	17 to 18
17500	20	Do.	10 0 0	8 0 0	8 to 9
5827	5	County & Gen. (L)	5 0 0		
2000	5	Do., preference . (Pater, Pembroke, Ely, Lea Bridge, Northfleet, Walton, & Ware.)	5 0 0		
5000	10	*Crystal Pal. Dist.*	10 0 0	10 0 0	13 to 13½
5000	10	Do.	1 0 0	7 0 0	1 7 6
10000	10	Do., preference .	10 0 0	6 0 0	12½ to 13

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
4000	50	*Equitable*	50 0 0	10 0 0	70 to 72
4000	25	Do., new shares.	25 0 0	10 0 0	35 to 36
23406	10	European (Lim.) .	10 0 0	10 0 0	12¾ to 12¾
12000	10	Do., new shares.	5 0 0	10 0 0	6¾ to 6¾
		Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)			
20000	10	*Gt. Cent. Gas Cons.*	10 0 0	10 0 0	12¼ to 13
5000	10	Hong Kong (Lim.)	10 0 0		8 to 10
26000	50	*Imperial*, old sh.	50 0 0	10 0 0	70 to 70¾
1300	100	Do., bonds . . .	£100	10 0 0	180 to 185
7000	25	Imperial Austrian .	10 0 0		
28000	50	*Impl. Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwp., Bordeaux, Brussels, Cologne, Frankfort-on-M., Haarlem, Stolberg, Toulouse, & Vienna	43 15 0	16 0 0	84⅛ to 85½
		Impl. Mexican (L.)			
3000	40	*Independent* . . .	40 0 0	10 0 0	60 to 65
3000	10	Do.	10 0 0	5 0 0	7 to 9
3000	20	Do.	12 10 0	7 10 0	13 to 14
6886	50	*London*	50 0 0	10 0 0	68 to 70
5519	25	Do., 1st pref. .	25 0 0	6 0 0	28 to 29
568	50	Do., 2nd pref. .	50 0 0	6 0 0	
219	50	Do., 3rd pref. .	50 0 0	6 0 0	
18781		Do., 1st pref. sk		6 0 0	
11828		Do., 2nd pref. sk		5 0 0	

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
12000	5	Malta & Medit. (L.)	5 0 0	3 0 0	
30000	5	Oriental, Calcutta	5 0 0	3 0 0	4¾ to 5¼
30000	5	Do., new shares.	1 0 0	3 0 0	¾ to 1
10000	5	Ottoman (Limited)	5 0 0		2 to 4
10000	10	Pará (Limited) . .	10 0 0	£6 intr.	9½ to 9⅝
27000	20	*Phœnix*	20 0 0	10 0 0	25½ to 26
3600	100	Do., new	15 0 0	7 10 0	14¾ to 15
144000	8s.	Do. (capit. profits)		5 0 0	80 0 0
5000	20	*Ratcliff*	20 0 0	10 0 0	26 to 28
	20	Rio de Janeiro (L).	20 0 0	10 0 0	20½ to 21⅛
6959	5	Singapore (Lim.) .	5 0 0	3 0 0	
2000	5	Do., preference .	5 0 0	7 10 0	
		Shanghai			
4800	50	*Sth. Metropolitan*	50 0 0	10 0 0	75 to 77
15000	10	*Surrey Consumers*	10 0 0	10 0 0	13¾ to 14
10000	10	Do., new	5 0 0	10 0 0	6 to 6¼
9000	50	United General . . (Dublin & Limerick)	50 0 0	4 12 0	28 to 30
10000	10	*Victoria Docks* . .			
3000	10	*Wandsworth & Putney*	10 0 0	7 10 0	13¼ to 14
20000	10	Western (Limited) A shares.	10 0 0	10 0 0	14¼ to 14¼
10000	10	Do., B shares.	5 0 0	10 0 0	8½ to 9
10000	10	Do., C shares.	3 0 0	10 0 0	5½ to 6
20000	10	Do., D shares.	1 0 0		1¼ to 2
8000	5	*West Ham*	5 0 0	7 10 0	6 10 0
6000	5	Do., new shares.	3 0 0	7 10 0	3 18 0
551	10	West London Junction (Lim.) . .	10 0 0	6 0 0	
520	10	Do., preference .	10 0 0	6 0 0	

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1½ in.	2 in.	2½ in.	3 in	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1, G. M. B.	3 15 0	2 11 0	3 12 6	3 10 0	4 0 0
1¼ and 2-inch Socket-pipes	7 10 0	6 0 0	6 15 0	6 15 0	7 10 0
2½ and 3-inch ditto	7 0 0	6 0 0	6 5 0	6 10 0	7 0 0
4 and 5-inch ditto	6 10 0	5 10 0	5 15 0	6 0 0	6 10 0
6 inches and upwards ditto	6 5 0	5 0 0	5 10 0	5 15 0	6 5 0
Retorts, 1st fusion, hot blast	6 0 0	—	5 5 0	5 10 0	6 0 0
Ditto, 2nd ditto, cold ditto	7 0 0	5 15 0	5 15 0	6 0 0	7 0 0
Tank-plates, ¼ thick and above	6 10 0	5 10 0	5 10 0	5 15 0	6 5 0

WROUGHT-IRON TUBING,

Subject to 50 per cent. Discount.

	2 in.	1¼ in.	1½ in.	1 in.	⅝ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 feet—per foot		1 0	0 10	0 7	0 5	0 4½
Ditto ditto, from 6 inches to 18 inches—each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows (wrought iron)	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, ditto	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	22 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2-quart	15 0	14 0	13 6	13 0	12 0	—

GAS COALS.—*Per Ton.*

Newcastle.—Unscreened:—

	s. d.
East Castle, Haswells, Nettlesworth Primrose, and South Pelaw	s. d.
Felling, North Pelton, Redheugh Main, Walker's Primrose, West Wear, and Whitwell Primrose	6 9
Burnhope, Craghead, Chariaw, Derwent, Edmondsley, Eighton Moor, Hartlepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, New Pelton, Pelaw Main, Ravensworth, South Moor Pelton, South Leverson, Townley Main, Tyne Main, West Pelaw, Wearmouth Hutton, and Witton	7 0
Peareth, Ravensworth Pelaw, Waldridge, West Garesfield, and West Pelton	7 3
Brancepeth, Dean's Primrose, Pelton, South Peareth, Stella, Urpeth, Washington Hutton, and West Leverson	7 6
Ramsay's Newcastle Cannel	20 0
Wigan Cannel (at Liverpool)	17 0
Scotch Cannel:—	
Boghead (at Leith)	30 0
Kirkness, best (at Burntisland)	28 6
Capeldrae, 1st quality (at ditto)	28 6
Ditto, 2nd ditto (at ditto)	18 6
Lesmahago (at Glasgow)	29 0
Ditto (at Granton)	30 0
Arniston	27 6
Wemyss	20 0
Haywood, Wilsontown (at Granton)	18 0
Pirnie	14 9
Lothian's Cannel (at Leith)	25 0
Myles' Cannel	21 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton:—

	s. d.
Chatham and Rochester	5s. 9d
Cork	3s. 6d. to 8 9
Dover, Folkestone, and Ramsgate	6 3
Dublin	3s. 0d. to 9 6
Exeter Quay	8 0
Ipswich	5 6
London (from Leith)	8 0
London (Pool)	4s. 0d. to 6 3
Lowestoft and Yarmouth	4 6
Portsmouth & Southampton	7 0
Plymouth	7s. 3d. to 7 9
Shoreham	6 6
Whitstable	6 3
Weymouth	7 6

Foreign.—Per Keel:—

Barcelona	£22 0s. to 23 0
Bordeaux	13 10
Boulogne and Calais	7 10
Cadiz	16 0
Cronstadt	—
Copenhagen	7 10
Genoa	20 0
Hamburg	8 0
Havre de Grace	9 5
Leghorn	22 0
Lisbon	15 0
Rotterdam	£7 10s. to 8 0
Stettin	10 0
Trieste	24 0
Venice	—

SUNDRIES.

Best Nstle. Fire-bks., p. 1000, £2 10s. to £2	15 0
Cliff's Fire-bks. (at Wortley), p. 1000.	2 15 0
Ingham's ditto (at Wortley), p. 1000..	2 15 0
Fire-clay Retorts, p. ft. run, 5s. 6d. to	0 7 0
Tough Cake Copper, p. ton	84 0 0
English Pig Lead, p. ton	19 10 0
Welsh Bar Iron (in London), p. ton..	7 0 0
Foreign Spelter, p. ton	19 10 0
English Block Tin, p. ton	85 0 0
Banca, p. ton	90 0 0
Tarred Rope Yarn, p. cwt.	1 0 0

BRADFORD CORPORATION WATER-WORKS.

WANTED, an Assistant Resident ENGINEER, competent to take charge of works for the making of a large Reservoir. No one who has not been employed on similar work need apply. Salary £150 per annum.

Applications, with testimonials, to be sent to me on or before Tuesday, the 14th of August next.

By order,
CHAS. GOTT, Water-Works Manager.

Swaine Street, Bradford, July 25, 1866.

WANTED, a Situation as Manager of a Gas-Work. Is quite capable of taking the entire management. No objection to go abroad. Good references.

Address A. E. FOWLE, Westerham, KENT.

TO BE SOLD, by Private Contract, in Lots to suit purchasers, THIRTY-FIVE SHARES in the Tetbury Gas and Coke Company. Present price of gas 5s. 10d. per 1000. Dividends paid half yearly.

Apply to Mr. C. BROWN, TETBURY.

WANTED, by the South Shields Gas Company, a thoroughly Steady and Trustworthy Man, as FOREMAN STOKER. He must well understand and have had good experience in the retort-house, engine-room, and governor-house.

Applicants to apply by letter, in their own handwriting, to state age, and give references to present and last places of employment. Wages, 33s. per week.

Address, W. J. WARNER, Engineer.

FOR SALE, an 8-in. Hydraulic Valve for working four purifiers—£35. A Purifier, 8 ft. by 4 ft. by 3 ft. 6 in. deep, covers and sieves—£25. Also Two Purifiers, 4 ft. by 1 ft. 6 in. by 2 ft. deep, with two valves, covers, connexions, and lifting apparatus, complete—£40. At GEO. CUTLER, jun.'s, 8, Wharf, Wenlock Road, City Road, LONDON.

TO TAR DISTILLERS AND OTHERS.

THE Hastings and St. Leonards Gas Company are prepared to receive OFFERS for the purchase on their Works of about 100,000 gallons of TAR per annum.

Apply to ALFRED H. WOOD, Gas Offices, HASTINGS.

July 24, 1866.

WANTED, a steady, active Working FOREMAN, who thoroughly understands the manufacture of gas, the laying of mains and service-pipes, and fixing of meters. A Smith preferred.

Wages 24s. per week, with house, coal, gas, and water free.

Applications, with testimonials, to be sent in to me at the Gas-Works, Sitwell Street, Groves, on or before the 9th inst.

F. W. OLDFIELD,
Secretary & Manager.

Hull, Aug. 2, 1866.

TO GAS COMPANIES AND ENGINEERS.

TO be Disposed of, by the Falmouth Gas, Coal, and Coke Company, Limited, a Cast-Iron GASOMETER-TANK, 45 ft. diameter by 14 ft. deep, in excellent condition—estimated weight about 78 tons; together with the bolts and nuts, belt-hoops, &c., belonging thereto. Now lying at Penryn, very convenient for shipment or delivery by railway.

Also with the above, or separately, the Framing and Angle Iron Curbs for a telescope gasholder to suit the above tank. Also the pulleys, chains, guide-wheels, bars, &c.

Application to be made to Mr. W. WARN, Secretary to the Company, Falmouth, Cornwall.

Dated Falmouth, June 23, 1866.

GEORGE GLOVER & CO.'S
PATENT DRY GAS-METERS.

The advantages of these Meters are best appreciated by a consideration of the evils they avert. The more prominent of these evils are the following:—

1. Inaccurate measurement, and varying registration.
2. Jumping of the lights, and their sudden extinction.
3. Escapes of gas through the plugs being left out, or imperfectly secured, when the Wet Meter has been replenished with water.
4. The gas passing without being registered at all.
5. The temptations and facilities to fraud which it is notorious the Wet Meter presents.

CLASSES X. & XXXI.

6. The damage to house property which the impracticable attempt to keep the lights from jumping, by giving all the pipes a gradual ascent from the Meter, so as to admit of the water trickling back into it, necessarily occasions.
7. The waste of gas from the higher pressure required to work Wet Meters, the possibility of the water freezing, and their axles and moving parts becoming corroded.

These faults, characteristic of the Wet Meter, and fruitful in annoyance, interruption to business, pecuniary loss, and danger, are entirely averted by the use of George Glover and Co.'s Patent Dry Gas-Meter.

It is, besides, more durable than the Wet Meter; and they maintain it in good working order for five years, free of cost to the purchaser; and for any number of years, at half the expense at which the Wet Meter can be maintained.

As regards accurate measurement, correct registration, the absence of temptation to fraud, safety, convenience, and economy, the superiority of their Dry Meter is admitted; and it has come more rapidly into use, both in this country and abroad, than any Meter hitherto manufactured.

The prices may be compared favourably with those of any meters in the market; and they are lower than most.

List of Prices, and all Particulars, may be obtained on Application.

RANELAGH WORKS, RANELAGH ROAD, PIMLICO, LONDON, S.W.;
127, BOULEVARD DE MAGENTA, PARIS; AND 15, MARKET STREET, MANCHESTER.

THE
GAS-METER COMPANY, LIMITED,
(LATE CROLL, RAIT, & CO.,)

Beg to intimate that the printed report of the official inspector of Gas-Meters for the City of Manchester for the year ending **1864** shows the following comparison:—

NEW METERS TESTED.

Of the Gas-Meter Company, Limited . .	Dry . .	1116	
	Wet* . .	1292	
Total		—	**2408**
Of George Glover and Co.	Dry		383

* The Unvarying Water-Line Gas-Meter, in regard to which the following extract from said report refers:—"The visiting justices will perceive, from a comparison of the tables now appended with those of last year (viz., 1863), *that there has been a large increase in the number of new wet meters tested, owing to the Gas Committee having substituted the wet for the dry in the case of hired meters.*"

Extract from printed report of the said official inspector for the year ending 1862, shows the following comparison:—

Croll, Rait, and Co., per centage of error on the number tested . . 8·671
George Glover and Co. " " " . . 22·727

E. J. & J. PEARSON,
DELPH & TINTAM ABBEY FIRE-CLAY & BRICK-WORKS,
STOURBRIDGE,
PROPRIETORS OF
BEST GLASS-HOUSE POT & CRUCIBLE CLAY;
MANUFACTURERS OF
GLASS-HOUSE POTS, CRUCIBLES, GAS-RETORTS, & FIRE-BRICKS OF EVERY DESCRIPTION.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gasfittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Station-Meters, Governors, Consumers Meters, Gas Lustres, Chandeliers, Brackets, &c., and every description of Gasfittings and Gas Apparatus.

MARTIN'S
LEE MOOR PORCELAIN FIRE-BRICKS,

Containing no Lime, and only ·45 of Oxides, resist the strongest heats, and will last for Gas-Works longer than any others.

Samples and prices sent, and the highest references given, on application to

MARTIN BROTHERS,

ST. AUSTELL, CORNWALL.

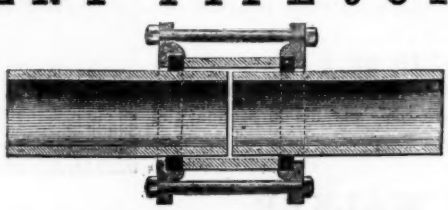
WALTER FORD,

159, GRAY'S INN ROAD, LONDON.

MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c. &c.

Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

DR. NORMANDY'S
PATENT PIPE-JOINTS.



SOLE MANUFACTURERS—

A. NORMANDY and CO., Engineers and Ironfounders,

HOLLY BUSH PLACE, BETHNAL GREEN ROAD, LONDON, N.E.

Also Sole Manufacturers of the Patent Marine Aërated Fresh-Water Apparatus, Steam Pumps Steam Winches, &c.

These Joints have been in use nearly three years on gas-mains, and are still perfectly sound. They have also been proved quite sound under a pressure of 680 feet head of water.

The advantages which these Joints offer are economy, perfect soundness and durability, ease and rapidity of application, use of perfectly plain pipes, so that a tight Joint may be made with cut pipes, even though the ends do not come close together. Any ordinary labourer is capable of securely fixing them.

These Joints are particularly applicable to gas, water, and suction pipes, and remain permanently sound; they are cheaper than the socket-joint, as they save the lead, the gasket, the iron forming the socket (which in a 3-inch main amounts to 10 lbs.), and the fire for melting the lead. There is also considerable saving of time, more than four Joints being made in the time required for making only one of the others, and by unscrewing the bolts, a pipe can be removed and replaced with the greatest facility.

By means of these Joints, which are made of all sizes, pipes made of either wrought or cast iron, copper, lead, tin, earthenware, glass, bitumen, gutta-percha, suction-hose, &c., may be rapidly and soundly united, and taken apart with facility.

THE GAS PRODUCTS UTILIZING COMPANY, LIMITED.

NOTICE is hereby given, that the Fourth ORDINARY GENERAL MEETING of this Company will be held at the London Tavern, Bishopsgate Street, E.C., on FRIDAY, the 10th day of August, at Twelve o'clock at noon precisely—to receive the Report of the Directors for the six months ending the 30th of June last, and to declare a Dividend for the same period.

By order,

THOS. GUYATT, Secretary.

10, Coleman Street, E.C., July 31, 1866.

LAMP-POSTS, Dwarf Gas Pillars, BRACKETS, and LAMPS. The NEWEST DESIGNS for these will, upon receipt of particulars, be forwarded free, on application to IRONFOUNDER, 3, Hollywood Grove, WEST BROMPTON, S.W.

GARSIDE'S Registered Tube-Vice and improved Main Drilling Clips may be had from the maker.

For drawings and prices apply to SAMUEL GARSIDE, Gate Field Iron-Works, ASHTON-UNDER-LYNE.

CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.

PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at

Mr. LYNCH WHITE'S,
Old Barge Iron Wharf, Upper Ground Street,
LONDON.

AUCHINHEATH, Lesmahago, Gas COAL, known in the market for the last fifty years as a first-class gas coal.

JAMES FERGUSON and CO.,

Sole Lessees of the Auchinheath Coal-Field, are prepared to ship the above at Glasgow, Greenock, and Ardrossan, on the west coast of Scotland; and at Granton or Leith, in the Firth of Forth, on the east coast. Also to forward them to any railway-station in Scotland or England.

Price and other particulars may be learned by addressing

JAMES FERGUSON and CO.,
GAS COAL WORKS,
LESMAHAGO.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the advertiser, 42, Parliament Street, WESTMINSTER. [Office of the JOURNAL OF GAS LIGHTING, &c.]

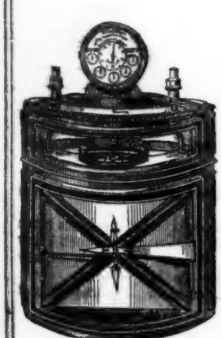
JAMES M'KELVIE,

CANNEL COAL MERCHANT,

HAYMARKET,

EDINBURGH.

Established 1840.



N. DEFRIES'S
PATENT DRY GAS-METERS,

WITH

THREE DIAPHRAGMS & ROTARY VALVES,

ARE

UNIVERSALLY USED IN ENGLAND AND THE COLONIES.

The MOST LIBERAL ALLOWANCE for WET GAS-METERS in EXCHANGE for DRY.

WORKS: DIANA PLACE, EUSTON ROAD.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

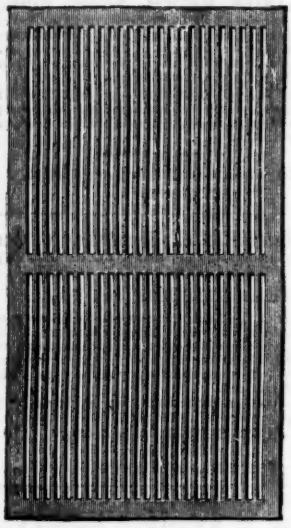
AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

WALKERS'

WOOD SIEVES OR GRIDS FOR PURIFIERS.



These celebrated Grids are used for and UNAFFECTED BY EITHER LIME OR OXIDE, WHICH IS SO DESTRUCTIVE TO IRON GRIDS. They are much cheaper, and VERY MUCH MORE DURABLE than Iron Grids.

DRAWING No. 1

Shows our most firm and durable kind of Wood Grids.

They are made BEVEL IN SECTION FOR KEEPING CLEAN, and for LARGER AREA OF GAS PASSAGE through them.

They have outside frames of HARD UNDAMAGEABLE WOOD, which enables them to be COMPRESSED UNDER HEAVY PRESSURE, PROTECTS THEM FROM ROUGH USAGE, and binds them together with STRENGTH AND SOLIDITY.

DRAWING No. 2

Shows our second quality of Wood Grids of a less substantial and cheaper kind. They are made parallel in section, and are suitable for lighter work.

Prices on application to

C. & W. WALKER,

Midland Works, Donnington, near Newport,

SHROPSHIRE; AND

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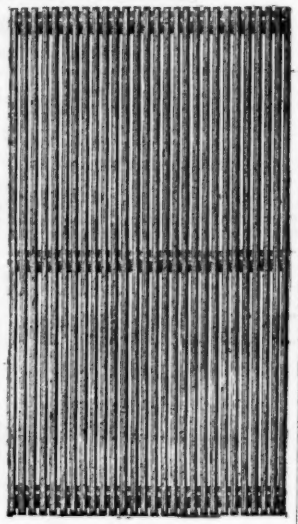

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ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES & FITTINGS,

PLAIN, GALVANIZED, & ENAMELLED, for Gas, Steam, and Water, from ⅛ in. to 6 in. bore.

STOCKS, TAPS, and DIES, GUN METAL GLAND-COCKS, WATER-GAUGES, &c.;

PATENT LAP-WELDED IRON TUBES,

For Locomotive and Marine Boilers, &c.

LONDON WAREHOUSE—No 66, QUEEN STREET, E.C.

1862.

PATENT ANTIMONY PAINT.

MADE ONLY BY

GEORGE HALLETT & CO.,

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CLASS II.

This Paint having been in general use over four years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (28s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

Reference is kindly permitted by the Engineers of the City of London, Commercial, London, and Surrey Consumers Gas Companies, who pronounce it the best Paint known for their purposes.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs under 20s. per cwt., as compared with White Lead at 28s. per cwt.

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MR. JOHN ROMANS, Civil and Practical Engineer, may be consulted at the above address on all matters pertaining to Gas-Works, Water-Works, and other Engineering questions.

Plans and Specifications Furnished, Works Erected and Repaired, or taken on Lease for a term of years.

Mr. Romans is also agent in Edinburgh for supplying High-Classed Scottish Cannel Coal and Fire-Clay Goods.

FRASER'S PATENT RIBBED CAST-IRON RETORTS are being introduced at the Gas-Works, Derby, Shrewsbury, Portsea, Nottingham, Syston, Whitwick, Barrow-in-Furness, Seaham, Risborough, Leighton, Loughborough, Corwen, Castle Donnington, Kegworth, Royston, Woking, Swadlincote, Rugby, Carlow in Ireland, Stornoway, N.B.; also at Gibraltar and Montreal, &c.

Apply to Mr. A. C. FRASER, Gas-Works, COLCHESTER.

OXIDE OF IRON,
We are prepared to supply, on moderate terms,
HYDRATED PEROXIDE OF IRON (BOG OCHRE),
Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.
FRANCIS RITCHIE & SONS,
BELFAST.

INTERNATIONAL EXHIBITION,
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PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and "HONOURABLE MENTION" for good quality of Fire-Bricks.
WILLIAM STEPHENSON & SONS,
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STOURBRIDGE FIRE-CLAY WORKS.
E. BAKER & CO.,
24 WHARF, NARROW ROAD, PADDINGTON, W.
FIRE-BRICKS, LUMPS, SQUARES, and TILES of all dimensions.
GAS-RETORTS always in stock.
GARDEN EDGINGS of various patterns.
ORNAMENTAL BUILDING BRICKS.
GRATE BACKS in various designs.
Contracts entered into to set Retorts, erect Furnaces, &c.
Shipments on the shortest notice.

THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS, &c. &c.
SCOTSWOOD FIRE-BRICK WORKS,
NEAR
BLAYDON-ON-TYNE.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire-Bricks, and every description of Fire-Clay Goods.

HARRIS and PEARSON,
PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY
MANUFACTURERS OF
FIRE BRICKS, GAS RETORTS, &C.
AMBLECOTE FIRE CLAY AND BRICK WORKS,
STOURBRIDGE.
Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.
NB A quantity of best Clay Retorts in stock, viz.—Circulars, 14 inches, 15 inches, 16 inches.
D's, 16×12, 15×14, 20×16, 16×18.

HANCOCK'S INDIA-RUBBER GAS-TUBING.
All sizes, from ¼ in. to 4 in. diameter and upwards.
Also,
INDIA-RUBBER BAGS for GAS-MAINS.
WASHERS for GAS and STEAM JOINTS.
VALVES (pure solid Rubber) for STEAM-ENGINES.
PACKING (Roll or Sheet) for STEAM-ENGINES.
STRAPS (Rubber and Canvas) for DRIVING MACHINERY.
HOSE-PIPES to convey HOT or COLD WATER.
COKE-HOSE, made specially for rough usage.
GAUGE GLASS RINGS and WASHERS.
SUCTION and DELIVERY HOSE-PIPES for PUMPS, FIRE-ENGINES, BREWERIES, and FACTORY purposes.
BRASS JETS, STOP-COCKS, SPREADERS, and UNION CONNECTING-JOINTS fitted to ditto.
Illustrated Price-Lists on application.
JAMES LYNE HANCOCK,
Vulcanized India-Rubber Works,
GOSWELL MEWS, AND 266, GOSWELL ROAD, LONDON, E.C.

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THE ONLY PRIZE MEDAL AWARDED FOR TUBES AND FITTINGS.
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JAMES RUSSELL & SONS,
Patentees and First Makers of Wrought-Iron Tubes.

W. J. HOLLANDS,
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SOCKET, FLANGE, HOT-WATER PIPES, AND ALL CONNEXIONS; RETORTS, HYDRAULIC MAIN, LAMP-COLUMNS, &c.; AND EVERY DESCRIPTION OF CASTINGS AND WROUGHT-IRON-WORK FOR GAS AND WATER-WORKS, STEAM, AND GENERAL PURPOSES.
N.B.—All goods kept in stock, and supplied at wholesale prices. Estimates given, and orders by post punctually attended to the same day.

BIRTLEY IRON WORKS,
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Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
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BELGIAN CLAY RETORTS.
J. SUGG and CO., late ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communications, addressed to J. SUGG and Co., GHENT, will receive immediate attention.

ESTABLISHED 1827.
JOHN BEVERLEY and SON,
MARK LANE, LEEDS.
Manufacturers of Patent Metallic Wet Gas-Meters, Station-Meters, Experiment-Meters, Governors, Pressure-Gauges, Syphon-Pumps, &c.
Inventors and sole manufacturers of Beverley's double-cased Gas Cooking Apparatus, unequalled in economy, comfort, and cleanliness.
Meters of any maker altered and put into complete repair, to meet the requirements of the Sale of Gas Act

ROBERT MACLAREN and CO.,
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Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

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Manufacturers of
CHANDELIERS, PENDANTS, BRACKETS,
Brass and Iron Gas-Fittings, Steam and Water-Cocks &c., &c.
Also,
PATENT WELDED IRON TUBES,
For Gas, Steam, Water, and other purposes.
GAS APPARATUS OF EVERY DESCRIPTION.
High-pressure Water-Valves and Cocks, &c., &c.
Plumbers Brassfoundry,
BRASS, COPPER, COMPOSITION, AND LEAD TUBES.
Works: Birmingham, and Great Bridge, Staffordshire.

ALFRED PENNY, Gas and CONSULTING ENGINEER,
WENLOCK IRON WORKS,
21 & 22, WHARF ROAD, CITY ROAD, LONDON.
Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, T-pieces, &c. &c.
Plans, Specifications, and Estimates prepared.

FREDERICK RICHARDS,
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WILMSLOW, CHESHIRE.
Plans, Specifications, and Estimates made for New or the Alteration of existing Gas-Works.
Gas-Works leased, or Estimates given for the Manufacture of Gas per Contract for a term of years.
Manchester Office: 8, Cateaton Street.

GAS COAL.
MESSRS. RICHARD EVANS & CO., Haydock Collieries, near St. Helen's, are prepared to SUPPLY their best GAS COAL to Gas Companies on favourable terms.
This Coal is extensively used by some of the largest Gas Companies in the Kingdom.
It produces 9,400 cubic feet of 17-candle power, and yields 13 cwt. of coke per ton.

JAMES NEWTON & SONS,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
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DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.

B. CARPENTER'S Improved Wood SIEVES for Gas-Purifiers.
Works: 14, John Street, Pentonville Road, LONDON, N.
The above sieves are used by the principal gas companies in London and the country. Their utility, durability, and cheapness combined, render them superior to all others.
Testimonials from gas engineers who have tested their qualities forwarded on application.
All orders punctually attended to, and estimates given if required.

MR. G. W. STEVENSON, C.E., F.G.S., (for the last 10 years Engineer to the Corporation of Halifax), may be consulted upon all matters connected with the construction of gas-works, and the manufacture and supply of gas; also upon the construction of water-works and the supply of water to towns; and also in respect to the sewerage of towns, and sanitary works generally.
Offices, Waterhouse Street, HALIFAX, and 14, Park Street, WESTMINSTER.

CATHELS'S Patent Four-Way Disc GAS-VALVES, applied to Purifiers, Gasholders, or other apparatus, save from ONE-HALF to TWO-THIRDS the number of ordinary Valves and Connexions. They are simple, strong, and durable; and having no ground faces or rubbing surfaces, cannot get set fast however long they may remain unmoved. The direction in which the Gas is passing can also be seen at a glance.
Descriptive Circular, Prices, &c., furnished on application to the Manufacturers, Messrs. GUEST and CHRIMES, ROTHERHAM.

J. T. B. PORTER & CO.,
GAS ENGINEERS,
MANUFACTURERS AND CONTRACTORS FOR GAS-WORKS
Of any extent at Home and Abroad,
GOWTS BRIDGE WORKS, LINCOLN,
AND
JOHN STREET, ADELPHI, LONDON, W.C.

SAMUEL CUTLER, Gasholder MAKER and CONTRACTOR
For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS.
PROVIDENCE IRON WORKS,
MILL WALL, POPLAR, LONDON, E.
Main Laying and Gas-Works erected complete.

WALTER MABON & CO.,
Engineers,
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FAIRFIELD STREET, MANCHESTER,
MANUFACTURERS OF
IRON TANKS, GASHOLDERS,
GAS APPARATUS,
PIPES, VALVES, IRON ROOFS,
WROUGHT AND CAST-IRON GIRDERS.
DESIGNS, SPECIFICATIONS, & ESTIMATES FURNISHED.

J. STRACHAN,
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Having had many years experience in the adjustment and regulation of the supply of gas to public lamps, begs to offer his services to Gas Companies, Corporations, or Boards of Health, on reasonable terms.
Contracts taken for laying mains, general repairs, and extension of gas-works.

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THE BUSINESS OF

WILLIAM SUGG,

GAS ENGINEER,

is removed to his New Factory,

VINCENT WORKS, VINCENT STREET,

REGENT STREET, WESTMINSTER.

WATER AND GAS PIPES,

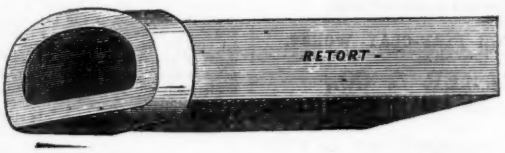
AND EVERY DESCRIPTION OF CASTINGS.

CLARIDGE, NORTH, AND COMPANY,

PHŒNIX FOUNDRY, BILSTON.

KING BROTHERS,

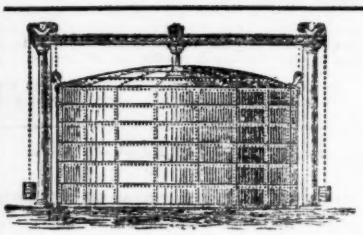
STOURBRIDGE FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge.'



IMPROVED GAS APPARATUS,

FOR TOWNS, VILLAGES, &c.

INVENTED AND MANUFACTURED BY

W. C. HOLMES & CO.,

WHITESTONE IRON-WORKS, HUDDERSFIELD.

WILL BE SENT ON APPLICATION:—

PLANS, SPECIFICATIONS, and PRICES of GAS APPARATUS;

PLANS, SPECIFICATIONS, and ESTIMATES of the requisite BUILDINGS for each size of Apparatus;

PLANS of the IMPROVED ANNULAR CONDENSERS;

PLANS of the COMBINED PURIFYING APPARATUS, so eminently adapted for Exportation.

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WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

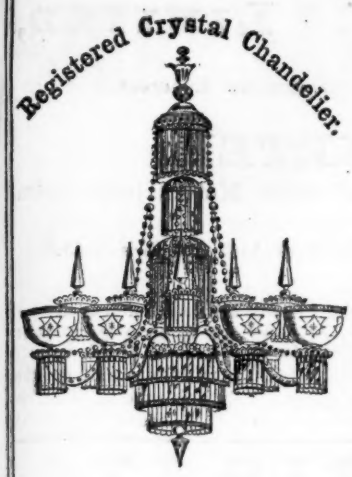
The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

GAS OVENS IN SEGMENTS OF EQUAL QUALITY.

A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*



TO GAS COMPANIES AND THE TRADE.

NOTICE OF REMOVAL IN CONSEQUENCE OF THE LATE FIRE.

J. DEFRIES AND SONS,

Gas Engineers, and Manufacturers of

CRYSTAL, BRONZED, & ORMOLU Chandeliers;

IMPROVED CRYSTAL STAR & SUN LIGHTS;

VESTIBULES, and every description of Gas-Fittings.

Temporary Show-Rooms:—16 & 17, COMMERCIAL STREET, WHITECHAPEL,

Five Minutes Walk from their late Establishment, 147, HOUNDSDITCH.

J. D. & SONS beg most respectfully to inform Gas Companies and the Trade that their CITY SHOW-ROOMS are now complete with every description of Lighting Mediums, including Registered Designs of Mediæval Gas-Fittings, Crystal, Bronzed, Ormolu, and Electro-Plated Chandeliers, Brackets, Vestibule-Lights, Bronzed and Gilt Statuettes.

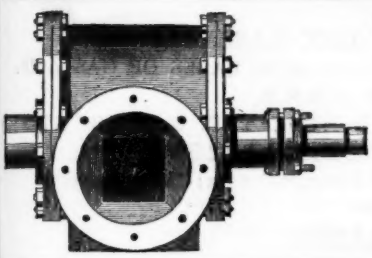
Special Designs prepared in perfect accordance with architectural arrangements. Estimates furnished for the Lighting and Fitting up of Theatres, Music-Halls, and Public or Private Buildings with Gas.

GAS-MOONS of the Newest Designs.

The PATENT GAS-REGULATOR and PURIFIER reduced to **6s. 6d. per dozen.** *Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for* 1865-66 *are now complete.*

Works: LONDON and BIRMINGHAM.

The CRYSTAL CEILING, with Ventilating Apparatus, manufactured by J. Defries and Sons for the Strand Music-Hall.



ROTATORY AND DOUBLE-ACTING GAS-EXHAUSTERS,

with many recent improvements, from 1500 to 150,000 cubic feet per Hour.

JAMES BURTON, SONS, & WALLER,

MAKERS OF ENGINES, MACHINERY, and IRONWORK for GAS-WORKS,
efficient and durable TAR, LIQUOR, and SYPHON PUMPS,
GAS-VALVES, with or without Wedges, worked with powerful Worm and Rack,
SELF-ACTING BY-PASS VALVES, with Lid and Relieving Lever,
ROTATORY, TUMBLER, and CAPILLARY WATER DISTRIBUTORS for SCRUBBERS.
SMALL-SIZE EXHAUSTERS KEPT IN STOCK.

JOHN'S PLACE, HOLLAND STREET, SOUTHWARK, LONDON, S.E.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER.

OFFICES REMOVED TO

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Mr. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.

PATENTEE & MANUFACTURER of the following Inventions:—

RETORT SETTINGS, heated by tar without the production of smoke.
STEAM-ENGINES and EXHAUSTERS, separately or combined.
FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS in which the Gasholder cannot tilt and cause accidents.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letter-press on the construction of Works, post free, 2s. 6d.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—Artizan.

Established

1795.

JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

FIRE GOODS, and SALT-GLAZED DRAIN-PIPES.

London Agent:

MARCUS BOURNE NEWTON,

Wharf No. 4, inside Great Northern Goods Station, King's Cross

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

THE

GAS-METER COMPANY, LIMITED,

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GEORGE RAIT, MANAGING DIRECTOR. T. G. BARLOW, C.E., CONSULTING ENGINEER.

CROLL'S DRY GAS-METER,

(Invented and Patented in 1844, since which time 200,000 of these Meters have been manufactured by Mr. CROLL,)

Obtained **PRIZE MEDALS** at the EXHIBITIONS of London, 1851, of New York, 1853, and Paris, 1855.

IMPROVED in 1858,

And was awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for

"GOOD CONSTRUCTION and SOUND WORKMANSHIP."

Now manufactured by the GAS-METER COMPANY, LIMITED, KINGSLAND ROAD, LONDON; and, for the purpose of obtaining greater accuracy in all its parts, the most perfect machinery has been adopted, "By which the construction of the Meter is much simplified, while its liability to get out of order is diminished." (See report of T. G. BARLOW, Esq., C.E.)

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MANUFACTURER OF

COMPENSATING & OTHER WET & IMPROVED DRY GAS-METERS,

Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

STATION-METERS & GOVERNORS,

WRIGHT'S REGISTERING PRESSURE-GAUGE, EXHAUSTER REGISTER, & REGULATOR;

STANDARD TEST GASHOLDERS;

Consumers' Governors; Inspectors' Pocket, King's, and all other kinds of Pressure-Gauges; Thermometers for Condensers, Pressure Registers, &c., &c.

EXPERIMENTAL TESTING APPARATUS,

Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, BI-SULPHURET OF CARBON TEST, THOMPSON'S BROMINE AND HEATING POWER OF FUEL TESTS, IMPROVED ALKALIMETER, EXPERIMENTAL METERS AND GOVERNORS, MINUTE CLOCKS, &c., &c.

"ANALYSIS OF GAS FOR PRACTICAL MEN,"

New and Enlarged Edition, with "Gas-Meter Testing under Sales of Gas Act," p.p. 25 Stamps.

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GAS ENGINEERS, IRON & BRASS FOUNDERS

Alliance Foundry, 147, East Milton Street, and Barrowfield Iron-Works,

GLASGOW;

AND AT SIMON SQUARE, EDINBURGH;

MANUFACTURERS OF

STATION & CONSUMERS METERS, ALL SIZES;

WROUGHT-IRON TUBES, FOR GAS, WATER, & STEAM; CAST-IRON RETORTS & PIPES,

HYDRAULIC MAINS, CONDENSERS, WASHERS, SCRUBBERS, PURIFIERS, & TANKS.

GASHOLDERS;

GOVERNORS, SLIDE-VALVES, &c.;

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Contractors for Gas-Works of any Magnitude. *Plans, Specifications, and Estimates furnished.*

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